

ROADS and STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

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ANN ARBOR, MICH.
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EUGENE S. POWELL, JR.
UNIVERSITY MICROFILMS



Final touches in a high-speed base laying job—see page 26 . . .
Maintenance aggregate produced by contract on regional basis . . .
Bridge design trends to meet material shortages . . . other articles
on wide range of contracting and highway departmental topics.

June 1957

up

and



**The Payoff Power
is Chrysler**



CHRYSLER INDUSTRIAL 33, in-line 6 Engine (265 cu. in. displacement) powers the Silent Hoist Lift-O-Krane—and many other makes of equipment in the construction and materials handling fields. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. inch displacement. For detailed information about Chrysler Industrial Power, write: Dept. G6, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

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over



Huge, collapsible rubber containers for economically storing and shipping flowable bulk are *filled, transported, loaded* with speed and ease by one man and a 12-ton Silent Hoist *Lift-O-Krane*. This unique fork truck-crane combination is powered by Chrysler for maximum-load performance with minimum maintenance . . . equipped with Chrysler gyrol Fluid coupling for smoother starting and acceleration, longer engine life.

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION



Bethlehem Cable Guard Rail Protects Motorists on Ohio Turnpike

Used as medial dividers and at bridge approaches, embankments and other danger spots along the new Ohio Turnpike, Bethlehem Cable Guard Rail forms a strong, effective barrier, with high resiliency and impact-absorbing qualities.

You can be sure of dependable protection for motorists when you install Bethlehem Cable Guard Rail. For this strong steel highway guard is designed for modern traffic, with its heavier volume and higher speeds.

Bethlehem Cable Guard Rail, with its special bumper-type bracket, is

simple in design, easy to install, and low in cost. It requires little maintenance, can be used with either steel, wood or concrete posts, and is furnished to comply with any state regulations. It comes with two, three or four cables, and with 1-, 1 1/4- or 1 1/2-in. anchor rods. Bethlehem furnishes cable guard rail, together with steel posts, brackets, cable ends, anchor rods, cable splicers and fittings, all of which assemble readily on the job.

Have you seen our big illustrated booklet, "Steel for Highways"? It

describes fully the complete line of Bethlehem Steel products used in building modern highways. Contractors find it informative and helpful. You can obtain a copy by writing either to Bethlehem, Pa., or to the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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ROADS AND STREETS

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Keep haul roads smooth and tightly packed! This analysis warns contractors that it may even pay to PAVE them if need be, to get rid of that ole debbil, "rolling resistance." A detailed case example.

Prestressed Paving Need Steel?

This writer makes a logical case for such design, and challenges highway departments to put in test sections—with hundreds of millions of dollars theoretical saving. A timely and provocative analysis.

Articles on Many Subjects:

New developments in mountings for expressway signs and signals . . . How the contractor blasted a mountain and moved a river to build a 4-lane road . . . Mechanically formed asphalt curbs, their cost and performance . . . More experience in use of computers.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription \$5.00 per year.

ROAD-BUILDING VETERAN PROVES
BEST EQUIPMENT, WELL MAINTAINED, PAYS OFF BEST



▲ MILLION-DOLLAR ARRAY of equipment like this takes \$7,000,000 relocation job on U. S. 21 in stride. This is just one of the many highway and airport grading and paving projects in Frank Mashuda Company's long and successful history. Tires shown are wide-base Hard Rock Lug by Goodyear.

◆ TYPICAL ON-JOB SETUP includes huge Quonset maintenance center and 2-way radio facilities. All vehicles and tires are kept in A-1 working condition at all times, on every job—and when no longer needed are returned to central maintenance center for general inspection and reconditioning. This has paid off, through the years, in one of the lowest down-time overheads in the industry.

80% of earth-mover tire down time ended by Goodyear

Other 3-T Nylon Cord Tires—
Tubeless or Tube-Type!

ALL-WEATHER
EARTHTMOVER

HARD ROCK LUG

HARD ROCK RIB

SURE-GRIP LUG

ROAD LUG



Look for this nearby Goodyear dealer sign
for better tire values—better tire care.
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3-T CORD TUBELESS!

CONTRACTORS REPORT that as much as 80% of tire down time is due to tube and flap troubles.

Goodyear TUBELESS tires and rims end all that—end high cost of tube replacement—and give you other important advantages:

Goodyear tubeless assemblies are *tops* in dependability, *tops* in easy mounting, save weight and run cooler. You often discover tire injuries *before* they become serious, repairs are simpler and can frequently be made *without removing tire!* As a result, tire failures hit all-time LOWS!

Be sure you specify GOODYEAR triple-tempered TRIPLE-TOUGH 3-T CORD TUBELESS for every size new equipment—and see GOODYEAR dealers for change-over of present vehicles.

Goodyear, Truck Tire Dept., Akron 16, Ohio.

Buy and Specify

GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND
All-Weather, Road Lug, Sure-Grip — T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

**SONOTUBE®
FIBRE FORMS**
save time, labor, money!



Providence River Bridge, North-South Freeway, Providence, R. I., Rhode Island Dept. of Public Works, Div. of Roads & Bridges. M. A. Gammie Company, contractors. Charles A. Maguire & Associates, Boston, consulting engineers. Photo: Courtesy New England Construction.

Three-foot diameter

SONOCO SONOTUBE®
formed the piers for this bridge!

The typical river bend for the Providence River Bridge included a concrete girder about 140 feet long supported on eight three-foot diameter round concrete piers formed by low-cost Sonoco SONOTUBE Fibre Forms.

These columns, in turn, are supported by a solid granite-faced pier section resting on a heavy tremie seal foundation and long steel H-piles.

SONOTUBE Fibre Forms save time because they erect quickly . . . save labor because they require minimum bracing and are easy to handle . . . save money because they are economical to use!

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For complete information and prices . . . write

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PRODUCTS COMPANY**

CONSTRUCTION PRODUCTS DIVISION

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14 SOUTH PARK STREET

AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.

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ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 65 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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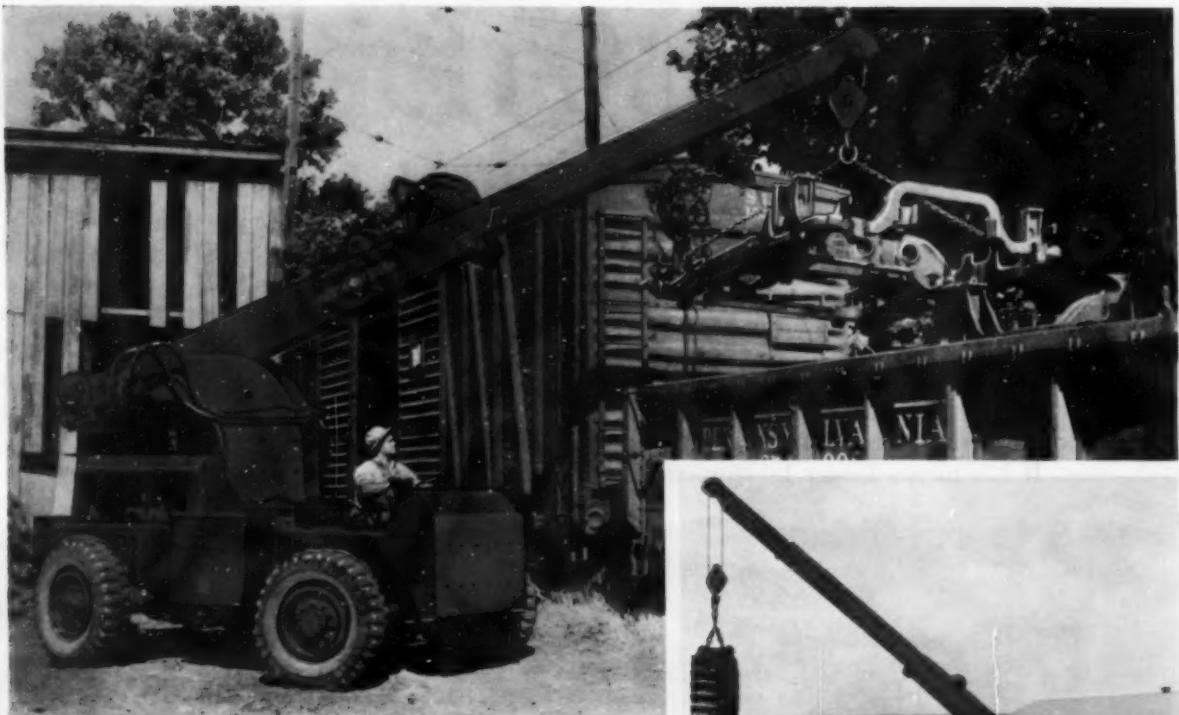
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A-W's live boom makes it the ideal tool for loading and unloading freight cars.

Here's the most versatile hoisting tool in industry... the A-W HYDRAULIC CRANE

Combining its unique pickup, carrying and placement capabilities with the best features of other types of cranes, the A-W Hydraulic Crane sets a new standard of performance. Take a look at some of the reasons why it does more jobs better than anything in its class:

Live boom action—The 18-ft. boom is under complete hydraulic control, responds instantly to the operator's touch with smooth, positive action. Rotates a full 360° if necessary. Can extend and lift a live 5-ton load while it pulls, moving forward or backward at the same time. Because it's powered both ways, up and down, you can't drop anything you're hoisting—an important safety feature.

Works indoors and out—Its sturdy, close-coupled chassis with all-wheel steer gives fast travel in and out of buildings and around obstacles. All-wheel drive and oversize tires take it through sand, across rough terrain, over rails with perfect ease. When the going is particularly tough, when storage areas are muddy or snowy, or there are ramps to climb or freight cars to push, all-wheel drive and the torque converter (optional) really do a job.

Easy, low-cost operation—Simplicity is the key-word for the entire operation of the A-W Crane, and anyone can easily learn to operate it in a very short time.

As for costs, this is the report of a typical user: "The daily machine cost

of \$11.11 is less than one hour's pay-roll of the six men this tool assists. With it, they are able to do a job in half the time. Very conservatively, our hydraulic crane is returning 100% a year on our investment."

Ask your nearby A-W distributor to tell you all about the time- and money-saving advantages of this remarkable machine. Or write direct to Austin-Western, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Aurora, Illinois.

Write for Data Book
2253—full of facts on
working ranges, boom
extensions, minimum
aisle widths, tractive
effort, towing capacity,
and special attachments.



AUSTIN-WESTERN WORKS

BALDWIN-LIMA-HAMILTON

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Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes

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ROADS AND STREETS, June, 1957

"Texaco Marfak stays

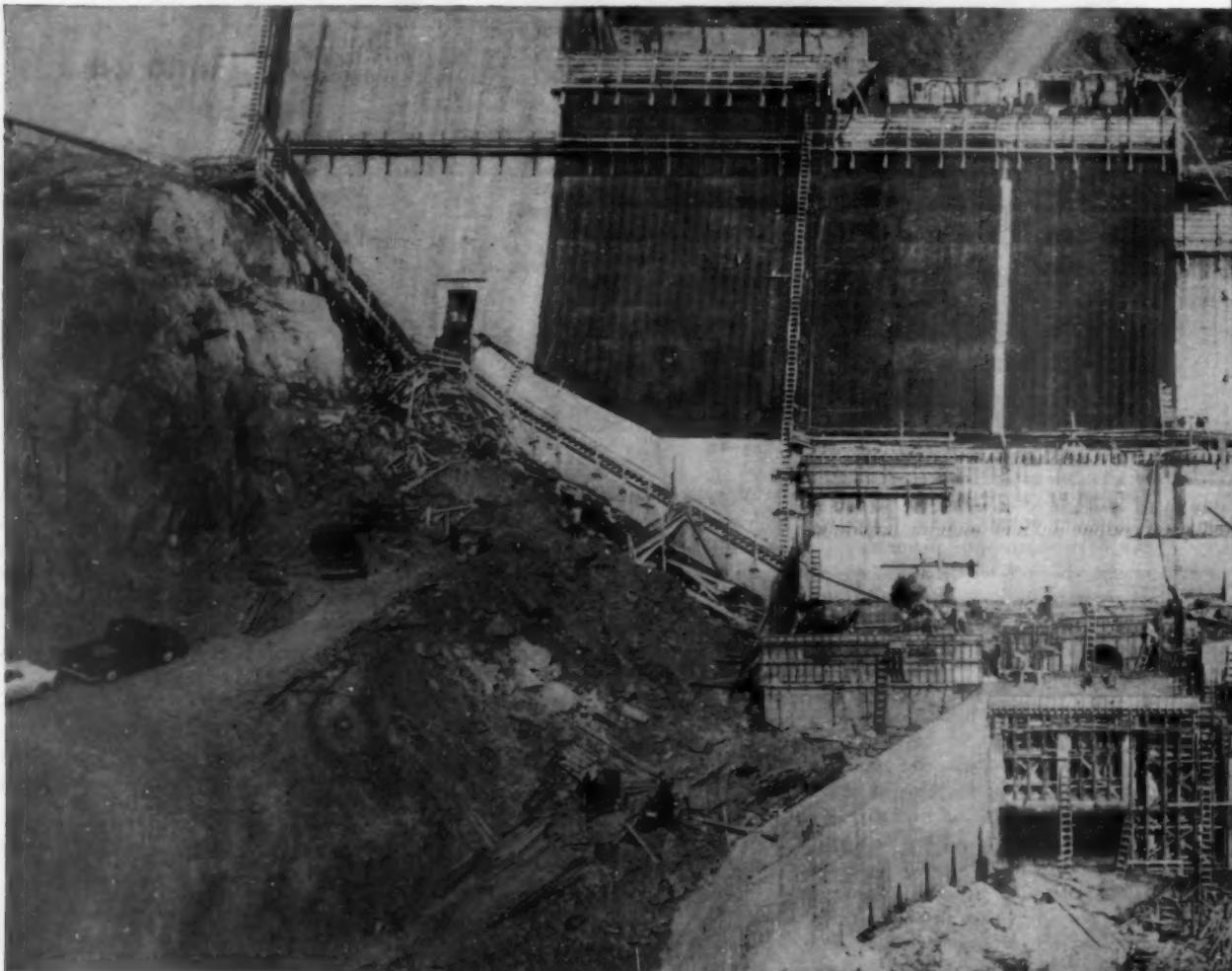
reports The Arundel Corporation & L. E. Dixon Company

You can see why the Tulloch Dam is a tough job — and mid-summer heat makes it even tougher on bearing grease. "It's the stay-put quality of *Texaco Marfak* that's most valuable to us on this job. Even under heavy shock loads, *Texaco Marfak* stays in chassis bearings. It seals out dust and dirt—and prevents rust. It has meant longer life for our parts,

lower maintenance cost, and, above all, our equipment stays on the job."

Mud and dirt are kept out of wheel bearings too by *Texaco Marfak Heavy Duty 2*. This assures safer braking and extra miles between lube jobs. No seasonal change is ever needed with *Texaco Marfak Heavy Duty 2*.

The builders also comment on the cleanli-



TEXACO

in the bearings longer"

ness of their diesel engines which use *Texaco Ursa Oil Heavy Duty*. Like all *Texaco Ursa Oils* it makes diesels and heavy duty gasoline engines deliver more power with less fuel over longer periods between overhauls.

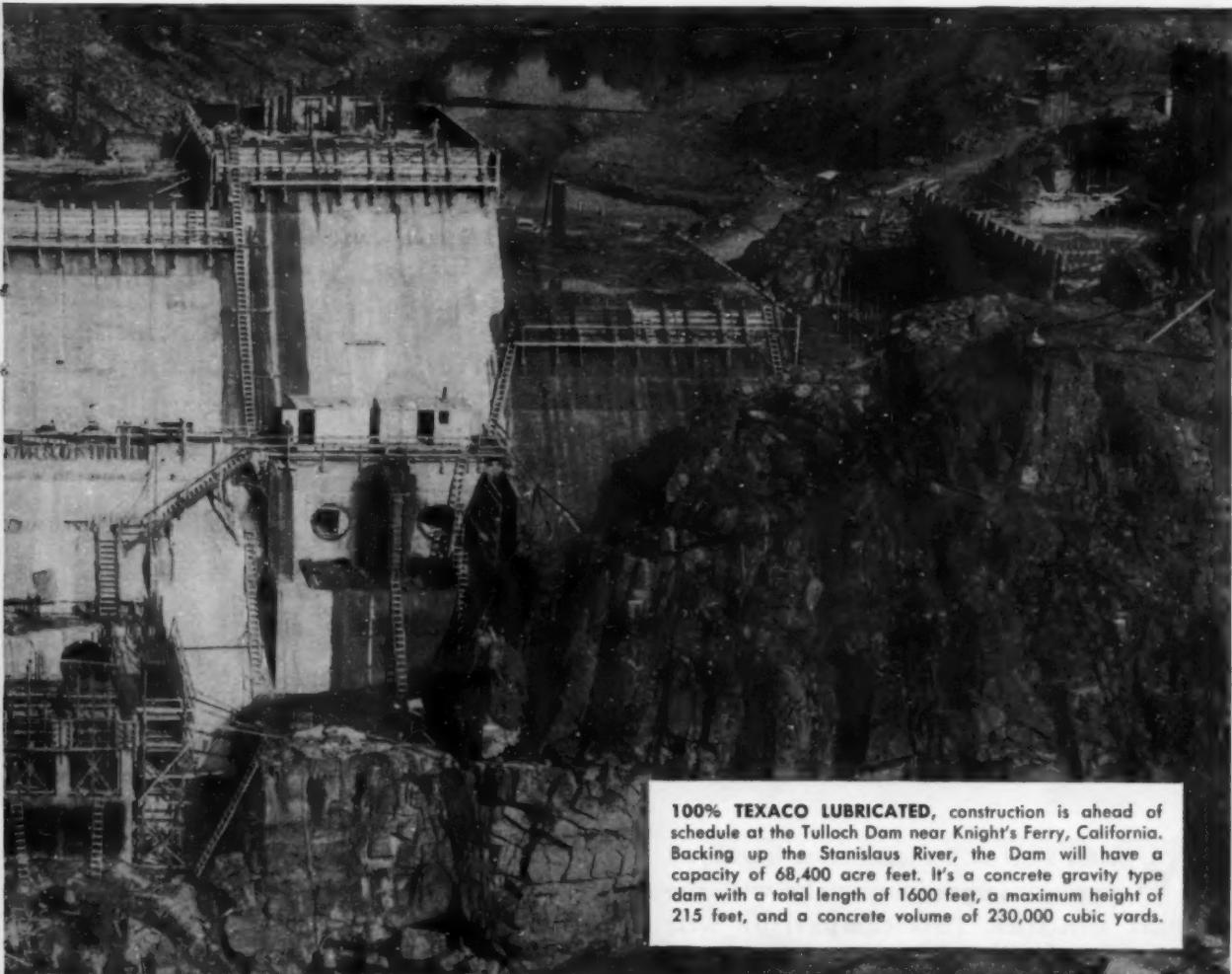
Your crawler mechanisms will work smoother when fully protected like those on the Tulloch Dam job with *Texaco Track Roll Lubricant*. And you'll be sure your drills—running or idle—are protected against rust

with *Texaco Rock Drill Lubricant EP*.

ASK A TEXACO LUBRICANT ENGINEER to set up a Texaco Simplified Lubrication Plan for your project. All you have to do is call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

★ ★ ★

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.



100% **TEXACO LUBRICATED**, construction is ahead of schedule at the Tulloch Dam near Knight's Ferry, California. Backing up the Stanislaus River, the Dam will have a capacity of 68,400 acre feet. It's a concrete gravity type dam with a total length of 1600 feet, a maximum height of 215 feet, and a concrete volume of 230,000 cubic yards.

Lubricants and Fuels FOR ALL CONTRACTORS' EQUIPMENT

... for more details circle 334, page 16

ROADS AND STREETS, June, 1957

without question, and with loads of proof *

the **P&H** Miti-Mite is production and earning



WHEN YOU BUY a truck crane it will pay you to compare any make with the P&H Miti-Mite. This comparison will prove to you what thousands of contractors experience every day—the Miti-Mite out-performs any other small truck crane no matter what the attachment.

Compare these facts and figures: the Miti-Mite delivers its full rated capacity *around the*

full 360° for complete flexibility . . . the Miti-Mite is rated at 8-ton crane capacity at 12' radius . . . has an 11 cubic foot shovel capacity and a maximum trench hoe width. And for crane use the Miti-Mite can handle a 50 foot boom with a 15 foot jib. These are the features you want in a truck crane for real capacity and high earning power—you'll find them only in the P&H Miti-Mite.

unbeatable in power



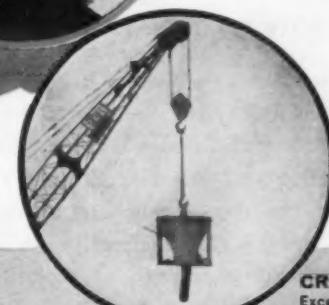
TRENCH HOE

Gooseneck boom permits greater digging depths and dumping heights. Performs in rock, hard pan, heavy shales, works in laterals, septic tank areas.



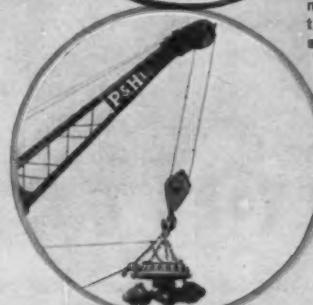
DRAGLINE

Full-size heavy-duty bucket is used by the Miti-Mite dragline attachment. For longer reaches, inserts in 5 and 10 foot lengths are available. Lattice-type boom provides strength without excess weight for faster cycles and greater payloads.



CRANE

Exceptional stability means faster operation with greater safety. Planetary boom hoist is standard. Boom point of the gooseneck is open-throated for maximum boom load clearance. 8-ton capacity at 12' radius.



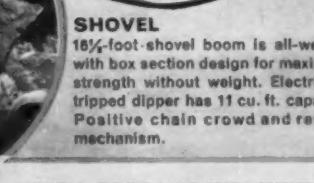
MAGNET

Handles 39-inch magnet with 5 kw. generator. Planetary boom hoist provides quick adjustment to any working angle.



CLAMSHELL

No need for lightweight buckets with a Miti-Mite—this versatile machine swings a standard construction bucket.



SHOVEL

18½-foot-shovel boom is all-welded with box section design for maximum strength without weight. Electrically tripped dipper has 11 cu. ft. capacity. Positive chain crowd and retract mechanism.

HERE'S PROOF OF MITI-MITE'S EARNING POWER!

Harnischfeger Corporation, Dept. 1-J

Construction & Mining Division

Milwaukee 46, Wisconsin

Gentlemen:

Please send illustrated, certified, on-the-job performance reports proving Miti-Mite's extra capacity and earning power.

Name _____

Firm _____

Address _____

City _____ Zone _____ State _____

HARNISCHFEGER



Construction & Mining Division
Milwaukee 46, Wisconsin

for more details circle 286, page 16
ROADS AND STREETS, June, 1957

"65" PAYHAULER® hauls

4-ton rocks and $\frac{2}{3}$ -mile haul involved in Oregon road straightening job!

The wet, sticky clay in these pictures will give you an idea of the working conditions encountered by the "65" Payhauler operated by the Funderburk Construction Co., Sutherlin, Ore., on their 2-mile road job near Elkton. This clay cut machine efficiency on the job as much as an estimated 50%. Truck bodies had to be scraped clean periodically. And a bogged-down 1½-yd shovel had to be replaced by a sure-treading 3-yd International Drott TD-18 Skid-Shovel®.

In spite of these rough working conditions...and in spite of big 4-ton blocks of rock found in the clay...the International "65" Payhauler still maintained an average of 96 yds per hour on the $\frac{2}{3}$ -mile haul to the fill.

Veteran earthmover and Payhauler operator, Aaron Johnson, stated, "Here is the poorest loading material I've ever seen. Still I'm getting six 16-yard loads each hour over a cycle distance of 1½ miles."

Don't let unexpected weather and resultant job-bogging clay, mud, or water hold up your off-highway hauling jobs. Consider these all-weather, all-condition Payhauler advantages: proper weight distribution with 71% of total load on "95" drive wheels...74% of total load on "65" drive wheels; ample power from turbo-charged diesel engines with built-in fuel savings up to 10%; maximum power-transfer efficiency of International's long-lasting cerametallic-faced clutch; and load-matched gear ratios for smoother, faster selection of the right gear for every grade...every road condition.

Rock, bigger than 3-yd Skid-Shovel bucket, found in wet clay cut operating efficiency. Payhauler body, fabricated from abrasion-resistant high-tensile steel, together with strongest frame in its class, stands up to tough punishment of rock loading.



**INTERNATIONAL[®]
CONSTRUCTION
EQUIPMENT**

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

... for more details circle 292, page 16

in spite



96 yds per hour



of job-bogging sticky clay!

Double-acting hoist cylinder in all stages with 106,300 pounds of force in first stage raises body in seconds. Hydraulic snubbing action prevents undue stress on hoist cylinders and "gentles" body return to frame.



International Drott TD-18 Skid-Shovel replaced 1½-yd shovel to load clay, big boulders into "65" Payhauler. "65" gives you big, bonus-producing 18-ton capacity, Model "95," 24 tons.

International trio...TD-18 Skid-Shovel, TD-24 tractor and Model "65" Payhauler promote production for Funderburk Construction Co., in spite of wet, sticky clay and big, stubborn rock.



What about rubber

MANY highway engineers, contractors and officials have asked about the actual value of alloying asphalt with rubber for seal coats and light surface treatments. Our best answer is try RUBARITE and see.

RUBARITE is a powder of unvulcanized synthetic rubber combined with minute particles of a special carrier for easy handling, rapid mixing and thorough dispersion to assure maximum improvements.

We can show you how RUBARITE reinforces asphalt to improve its toughness, adhesion, ductility, flexibility and susceptibility to heat and cold. We also can show you how these improvements relate to seal coats.

And we can cite case after case where, compared to regular asphalt, RUBARITE permitted coating in cooler weather, gave mats up to twice the thickness, set up quicker to allow an earlier return of traffic and produced unusually high cover stone retention.

Cost? We have figures to prove RUBARITE adds no more than a few cents per square yard, can often save you money through use of local stone or less asphalt or less loss of cover stone.

But the best test is your test! Why not write for details, samples and the free booklet, "Bitumen Rubberizers," which also details the use of RUBARITE for more durable hot-mix jobs and other applications. Address: Rubarite, The Goodyear Tire & Rubber Company, Akron 16, Ohio.

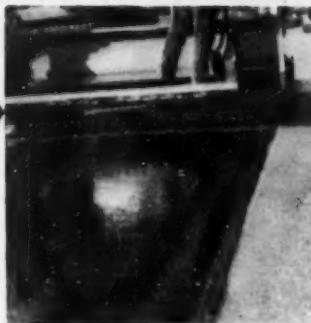
RUBARITE by

GOOD 

THE GREATEST NAME

WHAT ABOUT APPLICATION?

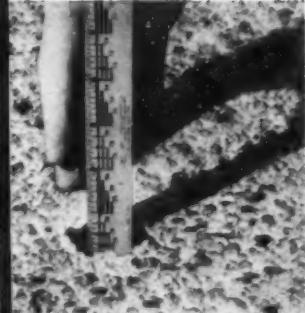
Asphalt alloyed with RUBARITE flows freely, coats uniformly, penetrates and seals cracks and checks — often with less material than with normal asphalt or cutback. It also retains its adhesiveness much longer and at lower temperatures to reduce cover stone loss, particularly during cold weather.



WHAT ABOUT TRAFFIC RETURN?

Asphalt alloyed with RUBARITE sets up quickly to permit an earlier return of traffic. In the case pictured (left), the truck passed over the gravel at about 35 mph, within minutes after it was laid and before it was compacted. Note there is no loss of cover stone and no bleeding through of the asphalt.

alloys for seal coats?



WHAT ABOUT MAT THICKNESS?

The photograph speaks for itself. Laid down in Tennessee with RUBARITE/asphalt alloy, the mat is more than twice as thick as that which could be obtained with regular asphalt.



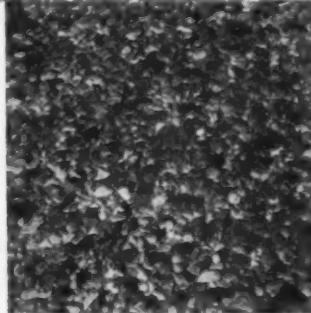
WHAT ABOUT ADHESIVE LIFE?

Here's a six-month-old RUBARITE seal coat in Mississippi. Note the strings of rubberized asphalt which are an excellent indication of the lasting adhesion and ductility of the material.



WHAT ABOUT COVER RETENTION?

Pictured here is a comparison of seal coats in Arkansas, after lengthy exposure to traffic. The RUBARITE seal coat (left) retained 80% more cover stone than the regular seal coat (right).



WHAT ABOUT GENERAL DURABILITY?

Here's a RUBARITE seal coat, covered with low-cost crushed gravel, in the State of Washington. Note the practically original, uniform, nonskid surface in face of two full years of logging and other heavy traffic.

YEAR
IN RUBBER

... for more details circle 348, page 16

ROADS AND STREETS, June, 1957

Rubarite-T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

WHAT'S NEW in Equipment and Materials

Small-Head Vibrator

Wyzenbeek and Staff, Inc., 223 N. California Ave., Chicago 22, Ill., announces two additional sizes of small vibrator heads which are interchangeable with the standard 1 1/8 in. "Junior" head.

One of the new heads is 1 1/8 in. in diameter and has the "kick" of a conventional head, with the added advantage of being able to work in narrow forms with many reinforcing bars. The other is only 1 in. in diameter (the smallest ever made, according to the company) and is of particular interest to producers of prestressed concrete. A 5-ft. or 7-ft. extension shaft of equally small diameter may be attached to the standard extensions, permitting use of shafting up to 21 ft. long.

For more information circle 101 on Service Coupon this page and mail now.

Riveted Aluminum Grating

A new aluminum grating has just been announced by the Klemp Metal Grating Corp., 6601 S. Melvina, Chicago 38, Ill. The RR type was especially designed to retain the combined advantages of a rectangular opening and riveted gratings. This grating remains structurally rigid regardless of cutouts in any part of the panel.

It is stated that the grating meets military specifications as to design and strength and is being installed on naval vessels.

There is a 79 percent clear opening with this rectangular design, so that

the possibility of dirt, oil or scum accumulating in corners is greatly reduced as compared to older riveted angular pattern types.

The special features of this new aluminum grating make it applicable in such fields as: petroleum, safety, mining, shipping, municipalities, automobile, chemical, room dividers, window visors, etc.

For more information circle 102 on Service Coupon this page and mail now.

Hoists for Trailer Dump Bodies

The Daybrook Hydraulic division, L. A. Young Spring & Wire Corp., Bowling Green, Ohio, has just announced a series of new "Speedlift" twin-cylinder hoists for trailer dump bodies. Direct lift design combines maximum capacity with a minimum of moving parts. Increased lifting power is gained through longer stroke and greater cubic inch displacement. Featured are the sealed hydraulic cylinders which carry Daybrook's one year warranty. Fifty-seven hoist models are listed for trailer lengths ranging from 14 ft. to 20 ft. and body lengths ranging from 14 ft. to 21 ft. Complete information is given on specification sheet Form 6789TT56.

For more information circle 103 on Service Coupon this page and mail now.

Geigy Weed Killer

Geigy Agricultural Chemicals, P. O. Box 430, Yonkers, N. Y. announces that claims have recently been accepted

by the United States Department of Agriculture for the use of Geigy Simazin for general weed control on non-cropped land. The product has been extensively tested in the United States and Switzerland and has been sold in Europe as a general herbicide for the past two years.

It is stated that when applied at a rate of 10 lb. per acre prior to weed emergence, Geigy Simazin 50W will prevent growth for about one year of such grasses and broadleaf weeds as barnyard grass, witch grass, yellow foxtail, wild oats, crabgrass, broadleaf plantain, dandelion, lamb's quarters, pigweed, ragweed, nightshade, purslane, velvet leaf and mustard. Relative non-toxicity to humans and domestic animals is claimed.

A wettable powder containing 50 percent active ingredient, Geigy Simazin 50W is recommended for control of broadleaf and grassy weeds in driveways, roadways, railroad beds, walks, around buildings, industrial sites and in similar non-cropped areas.

For more information circle 104 on Service Coupon this page and mail now.

More Equipment News Pages 168, 196

Carrier for Bulk Cement

Cement, fly ash, and other materials which can be "fluidized" by air are carried from factory and deposited in storage bins by the "Cemco Bulk Carrier," made by Cemco Industries, Inc., Galion, Ohio. Delivery into bins is through a pipe carrying low-pressure air, the material being dropped into an actuator which meters the amount going into the air stream each second. Therefore states the manufacturer, it is possible to carry powdered, pellet, or granular materials as much as 75 ft. high or 300 ft. horizontally, and to unload approximately 20 tons in 45 minutes. Air supply is provided by blower mounted on rear of the carrier. Elimination of bucket elevators and augers not only cuts original equipment costs but reduces maintenance.

For more information circle 105 on Service Coupon this page and mail now.

MAIL THIS COUPON TODAY!

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Please send me further information on products and materials mentioned in the June Roads & Streets as circled below

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NOT GOOD AFTER JULY 15, 1957

Mobile F-M Call Receiver

Seeley Electronics, 1060 La Brea Ave., Los Angeles 19, Calif., has announced a new FM mobile receiver. The model F "Car Call" is designed for use as an auxiliary receiver in conjunction with the many two-way mobile

(Continued on page 168)

A READER SERVICE FOR YOUR NEEDS



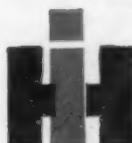
Nine heavy-duty backhoes dig the main lines. Heavy-duty front-end loaders doze half-yard buckets full for loading spoil into trucks.

700 miles of gas line trenching ...dug with 14 International® Utility tractors



Four rear-mounted trenchers dig the lateral lines. There's a crawl speed to match any digging job . . . variable from 0 to 600 feet per hour at the touch of a lever.

There are 5,000 IH dealers for prompt sales-service wherever your job is located! Your IH dealer will demonstrate. Look in the classified . . . call today!



See your

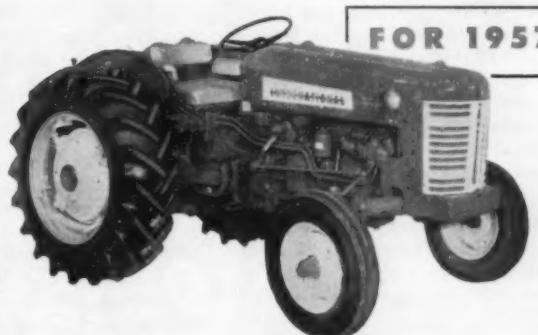
INTERNATIONAL HARVESTER DEALER

International Harvester products pay for themselves in use—McCormick Farm Equipment, Farmall and International Tractors . . . Motor Trucks . . . Construction Equipment—General Office, Chicago 1, Illinois.

Natural gas for the Pacific Northwest! Over 700 miles of main and lateral gas lines will soon give city-wide distribution for Spokane, Washington. All trenching is being done with rugged, work-eating International 300 Utility tractors . . . chosen for exclusive use on this job by Hall-Mac Construction Co., Houston, Texas.

Up to 1,000 pounds greater built-in weight in this rugged utility tractor gives greater backhoe pressure for faster digging . . . traction for bigger loader bites.

Work-speeding options also cut costs. *Integral power steering* saves time and effort in turning and loading. *Time-saving Torque Amplifier* boosts push or pull power up to 45 per cent . . . on the go, gives 2 speeds in each gear.



...the new, still more powerful INTERNATIONAL 350 UTILITY

Response like you've never known! Feel the smooth, new power of the engine. See the new, even more rugged, extra-heavy-duty front axle. Add these to many other time-tested features . . . the new International 350 Utility gives greater cost-cutting capacity than ever. Choose gasoline, LP Gas, or diesel engine.

... for more details circle 293, page 16



"We get maximum production at lowest bit cost with TIMKEN® carbide insert bits"

... Reports *The Bridge Construction Corporation*

IMPROVING U. S. Highway 1 near Woolwich, Maine, required the removal of 152,000 cubic yards of granite. In drilling blast holes to depths of 20 feet, the Bridge Construction Corporation, of Augusta, got maximum production at lowest bit cost per foot-of-hole with Timken® carbide insert bits.

Timken carbide insert bits permitted increased drilling speed and fewer bit changes. They made it possible to drill out full increments of drill steel.

They're your best bet, too, for drilling in tough, abrasive ground. But carbide insert bits may not be best for every job.

When drilling in ordinary ground

you'll find more economy when you use Timken multi-use bits. With correct and controlled reconditioning, they give you the lowest cost per foot-of-hole when you can drill out full increments of drill steel.

Timken carbide insert and multi-use bits save time because they're interchangeable in the same thread series. They permit you to switch bits when the ground changes without changing drill steels. Both types of Timken bits have a special shoulder union that protects threads from drilling impact.

And Timken carbide and multi-use bits are made from Timken fine alloy steel. We're the only American remov-

able bit manufacturer that makes its own steel. It enables us to control quality every step of the way.

For the right bit for your particular job, call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken Threaded
multi-use rock bit



Timken Threaded
carbide insert rock bit

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

your best bet for the best bit for every job

... for more details circle 337, page 16
ROADS AND STREETS, June, 1957

ROADS AND STREETS

Sixty-Five Years of Editorial Leadership



Washington News Letter

By Duane L. Cronk

June 10, 1957

Road construction will reach a new all-time high in 1957 despite the slowness of the Interstate program. The over-all figure will certainly reach \$5.8 billion, according to various estimates (BPR says \$6.0 billion). While not up to the \$6.8 billion prophesized last autumn, it is still a billion, or nearly 20%, ahead of 1956.

The continued upswing is due to the fact that the ordinary federal-aid (primary, secondary and urban) projects are in new high ground. This work is reaching the construction state quickly, because it is better organized and projects are simpler.

* * *

Within a few days the \$50-billion National Highway Program will have ticked off its first year of operation. On July 1, it will be 12 months since Congress launched a "grand plan" to construct the 41,000-mile Interstate System and to modernize the 700,000-mile federal-aid system. For weeks now, the most pertinent question in the roadbuilding industry has been: "How're we doing?"

The opinions, from both amateurs and experts, have been highly conflicting:

- A writer for The New York Times declared: "The highway program is hardly off the ground. The best guess is that little more than \$1,000,000,000 will come out of the Federal trust fund for Interstate roads this year, compared with the \$1,900,000,000 that had been expected earlier."
- A Forbes magazine reporter said: "To date the much-publicized program has been mainly dragging its feet, hampered by legislative red tape, soaring land acquisition costs, shortages of funds and of qualified engineers."
- In Washington last week, Bertram D. Tallamy, federal highway administrator, had a different opinion: "The program has not only gotten under way," he asserted, "but is making excellent progress and is right on schedule."
- Alfred E. Johnson, executive secretary of AASHO, also spoke optimistically: "It's true that some states are having difficulty getting under way. But, generally speaking, we're making good progress - as well as was expected."

How good is "as was expected?" Just a year ago, in the midst of enthusiastic newspaper predictions that roadbuilding would double overnight, Warren Fish, chief of the Bureau of Public Roads' Construction Division, warned:

"There is not going to be a drastic jump in highway construction. There will be a gradual climb for 3 or 4 years - perhaps only slightly more than the same rate as the past few years - and then a slow leveling off at a peak the industry and the highway departments can handle easily."

Roads and Streets found considerable disagreement among knowledgeable Washington experts that this would be the case. At the risk of appearing unduly cautious, however, it categorically listed in its June issue last year the bottlenecks that would prevent anything but a slow start:

"The potential obstacles to full production now coming into focus are not minor ones. Some are so knotty they will confound highway departments for years. It is safe to predict that some states will be seriously frustrated for months in their attempts to put the new funds to work."

Two of the anticipated bottlenecks were: (1) the lack of construction plans on the shelf, ready to award, and (2) the lack of engineers and the absence of really aggressive and intelligent recruiting programs to strengthen department staffs and boost production. This conservative outlook has been borne out by figures available today, for the first 10 months of the program.

* * *

It is obvious that most of the highway departments have not yet hit their stride, that the program is lurching along unevenly throughout the states. The long-awaited federal-aid money is reaching the contract stage at a pace that is disappointing to many industry people. But there are a dozen tortuous, time-consuming steps from the Congressional authorization to bid advertising.

• Just where in this long federal-aid pipeline are the billions of dollars authorized by Congress for roadbuilding in 1957 and 1958? How long for this long-awaited money to reach the contract stage?

* * *

A year ago May 1, there was \$4,066 million "in the works." Then, on July 1, Secretary of Commerce Weeks apportioned \$1,125 million more for fiscal year 1957. And on August 1, the Secretary dumped the 1958 apportionments into the funnel, another \$2,550 million. With state matching, these mammoth injections added nearly \$5 billion to the sums already available for roadbuilding.

Now, a year later, there is nearly \$7,706 million in the federal-aid pipeline. A big share of it is still in the early stages:

• Almost \$2,135 million "has not yet been programmed." These funds have not yet been requested by the states for projects in 1957 and 1958. Most of this money is months - as long as two years - from the construction stage.

• \$1,574 million has been "programmed" only. This means that the Bureau has approved for federal aid a list of projects submitted by the states in this amount.

• \$366 million has been "obligated" by the federal government to the states. This means that design plans for individual projects have been approved by the Bureau and the state highway department can go ahead seeking bids. Normally about six months elapses before actual construction begins.

19

- \$421 million is in "contracts awarded" but not yet begun.
- \$3,209 million worth of work (including cost of right-of-way and preliminary engineering) is under construction.

* * *

How fast is money moving through this pipeline?

About \$2,422 million was tallied for right-of-way and preliminary engineering authorized and construction contracts advertised during the first nine months of the program. The pace is stepping up monthly, particularly on the Interstate work. For example:

- Not quite \$55 million went into right-of-way and preliminary engineering authorized and construction contracts advertised in the 1st quarter of 1956 for Interstate work. In the 2nd quarter, only \$50 million moved through this category. But in the 3rd quarter (after the National Highway Program was authorized), this figure moved up to \$191 million, and in the 4th quarter it skyrocketed to \$696 million.
- During the first quarter of 1957, \$417 million reflected the seasonal drop, but it also indicated an increase of 661% over the same period a year ago.

* * *

Not all of this money is going into actual construction contracts - far from it. Historically, right-of-way and engineering have taken only about 7% of funds "obligated." But in the first quarter of this year, 56% of the \$417 million mentioned above was earmarked for these uses, leaving only \$185 million for construction. Much as the planners forewarned.

(Actually, only \$590 million in all has been brought to the construction stage on the Interstate System, compared with \$699 million authorized for preliminary engineering and right-of-way within the first 10 months of the program.)

Such figures bluntly illustrate where state officials are concentrating their energies. Little wonder that contractors are not yet working at full capacity and equipment and materials sales are not booming quite as some expected. The Interstate highway program is still, of necessity, in the initial stages - planning, location, design and land acquisition. Highway departments are playing the real estate market heavily, grabbing property before costs rise. Some \$5 billion must be invested in acquisitions for the Interstate System alone, much of it during the first years of the program.

(The largest request for funds the BPR has ever received from a state came in the other day from California - \$61 million - all for right-of-way, on one project.)

Engineering is taking a big bite out of the funds being obligated - about 13% currently. Like right-of-way acquisition, this, too, is a necessary first step which will become proportionately less as construction increases.

* * *

In spite of unprecedented sums being made available for engineering and design, however, many states are floundering in their plan production schedules. The engineering shortage, which has plagued some departments for years without

provoking them to remedial action, has forced them to turn over great portions of this work to consultants. In Virginia, for example, a severe shortage of staff engineers has forced the state to rely heavily on consultants for preliminary engineering and design. Some 25 out of 33 projects now in this phase have been "farmed out." Other states reportedly don't have enough staff men to check and approve their consultants' work.

The erratic pattern of progress among the various states is revealed in the following "standings" from David Beach, chief of the BPR's programming unit. Three states - California, Rhode Island and Maryland - have submitted programs earmarking all of their 1957 funds and 75% of their 1958 funds. Fourteen other states have programmed all of their 1957 funds; 7 states have earmarked 75-100%; 12 states - 50-75%; 7 states - 25-50%; and 6 states - less than 25%.

During the next six months, the states will eat heavily into these 1957 and 1958 funds. But in the meantime, Uncle Sam will have dumped another \$2.9 billion into the hopper and they will have to run hard to catch up to "where they was."

* * *

These advance steps will not affect construction volume for some time. 1957 is still not a bidders' market. Checking with contractors' associations and others in several of the states, Roads and Streets heard considerable disappointment among contractors. Typical comments:

• "Lettings have been disappointing. We haven't had a big letting for the last six months." ... "The work isn't coming nearly as fast as we had hoped. We are operating on a terrifically competitive price scale. Contractors here are geared to handle twice the work."

Modern engineering methods can ease some departments through the tremendous job of locating and designing miles of complicated expressways and structures before the contracts can be awarded. To a great extent, the progress of the National Highway Program in its first year must be measured in how well the states have succeeded in boosting their output of plans - through recruitment of new staff men, use of consultants, electronic computers, aerial photography and other shortcuts. If they have made strides in these internal improvements, they may well be in condition to turn the second year of the National Highway Program into a period of unprecedented production.

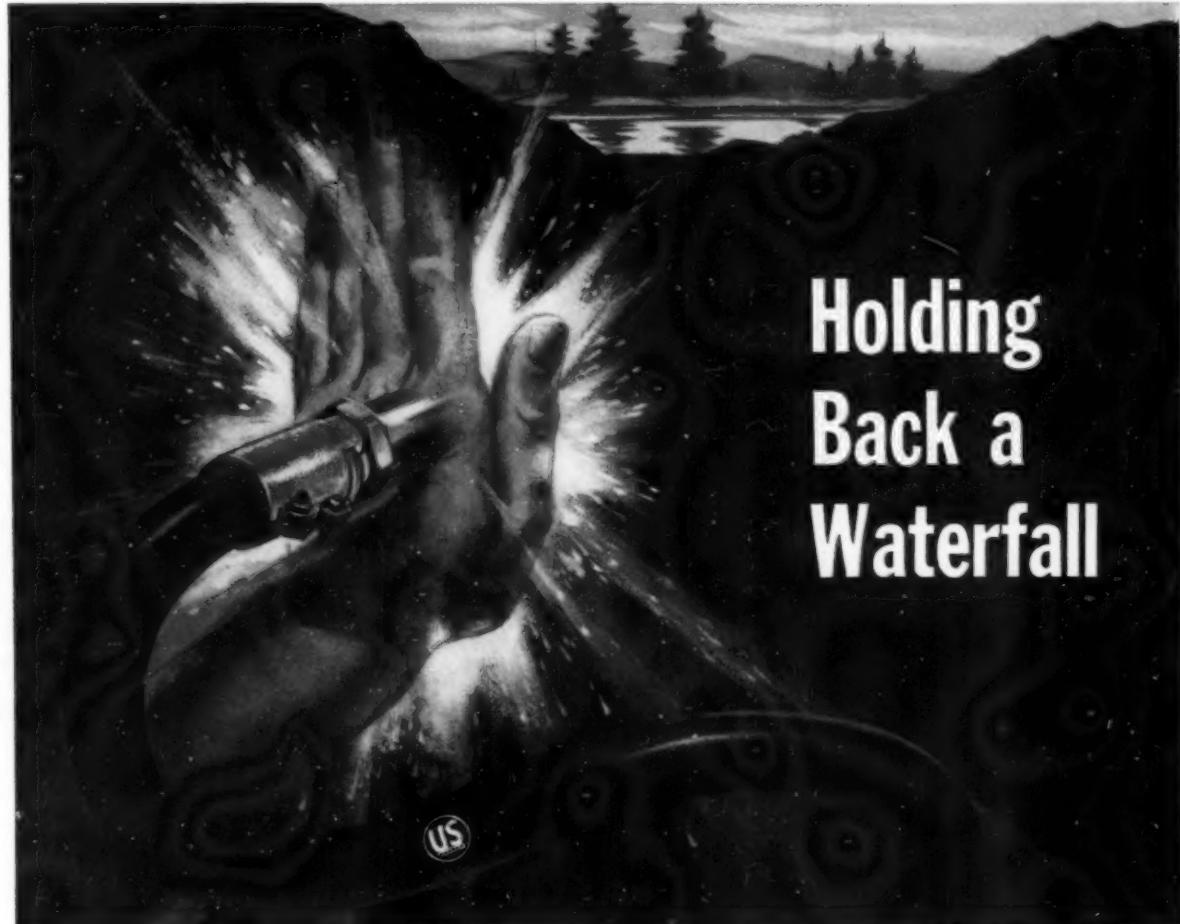
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Local highway officials have feared that the other federal-aid systems would be neglected in the rush to make a showing on the Interstate network. The Bureau's records indicate this is not the case. Federal funds for the Primary, Secondary and Urban systems are flowing out evenly although still not in as great a volume as hoped possible.

Out of the total of \$2,422 million in right-of-way, preliminary engineering authorized and construction advertised, close to half (\$1,137 million) was for work on these systems (primary, secondary, urban). The \$364 million pushed through this stage in the first quarter of this year was 12.6% more than in the first quarter of last year. (Unlike Interstate money, about 95% of these funds are going into actual construction contracts.)



GROUTING HOSE



Holding Back a Waterfall



U. S. RUBBER PRODUCTS AT WORK ON THE 44-MILE WEST DELAWARE TUNNEL

What do you do when you're building a tunnel 320 feet below ground and, without warning, a cascade of 2000 gallons of water per minute pours down from the roof? That's what happened recently in the construction of the 44-mile addition to the world's largest tunnel system—the Delaware Aqueduct, supplying water to New York City.

When this unwelcome waterfall began, all work had to stop. In addition, the flow could not be sealed by the usual methods. So quick-thinking engineers decided to put a 40-foot concrete plug into the tunnel itself, and place the grout through the plug and into the roof. A single length of U.S. Grouting Hose, on hand from previous grouting jobs, delivered all the grout needed to hold back the waterfall.

On the eighth day, the waterfall was stopped and time and work schedules were resumed. The U.S. Grouting Hose, *as good as ever*, had delivered 16,000 bags of grout under 1000 pounds per square inch pressure, and had withstood the sudden surges, the heavy blows, and the incessant gouging of this emergency operation.

This is just one more example of how U.S. Rubber Hose is engineered for top performance under normal—and emergency—conditions. This special report about United States Rubber on the West Delaware Tunnel continues on the following pages.



Mechanical Goods Division

United States Rubber

IN MUCK . . .

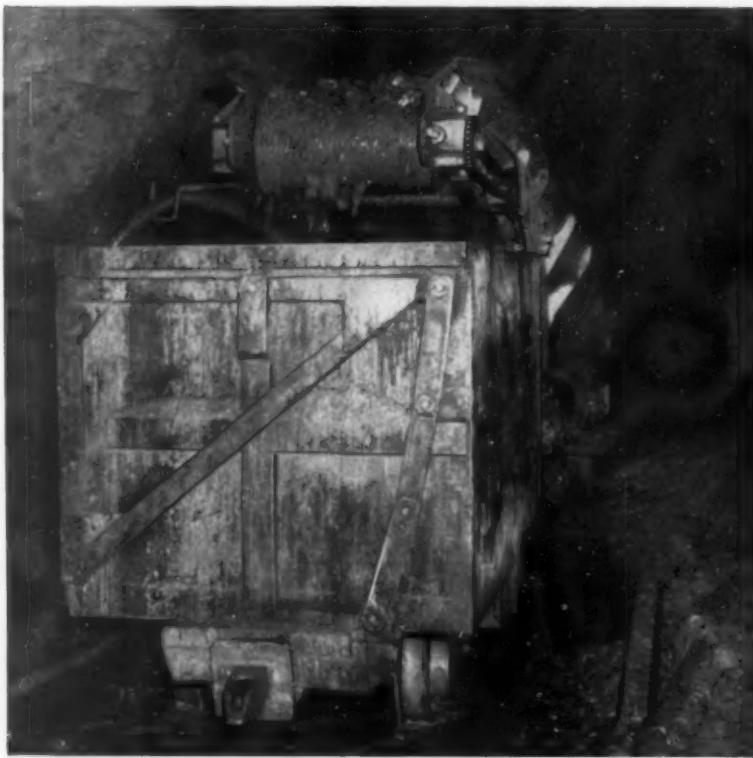


U. S. RUBBER PRODUCTS AT WORK ON

They are moving ahead at the rate of about 300 feet per day from the shaft headings and the West inlet heading of what will be the second largest tunnel job in the world—the 44-mile West Delaware extension of New York City's water supply system. The tunnel has a rough bore of 14 feet. When completed—in 1960—it will be finished to 11 feet 4 inches with its concrete lining.

Tunnel Progress

On the whole, the Cannonsville (N.Y.) end—the West end—of the tunnel is on schedule. Three shafts have been sunk to grade, turned horizontally, and about 8 miles of tunnel have already been dug from the three shafts and West inlet. These headings—five in all—are worked by 6-drill jumbo rigs cutting a 48-hole pattern into solid granite-shale



This is a 20", 4-ply (Style XN) cotton-nylon U. S. Matchless Mucker Belt in action near Shaft #2. The tough 3/8" top cover and 3/16" bottom cover resist moisture, abrasion, cutting and gouging. For added carcass protection against high impact and jagged rocks, special white cushion breaker ply of NYTON (a special nylon-cotton weave) "floats" in the top cover and lies between the bottom cover and the carcass.



"Red" Gatrell, Supt. of Shaft #2, pointing out the constant problem of water leakage to service engineers of U. S. Rubber on tour of the tunnel. Close and constant observation by "U. S." men of product performance is typical, and is one of the big reasons why U. S. Rubber products are engineered to the job, and outperform all others.

and sandstone. Once the drill holes have been made and the charges have been detonated, mucking machines—equipped with U. S. Rubber's Matchless® Mucker Belts—are brought in to remove the loosened rock (see picture at left).

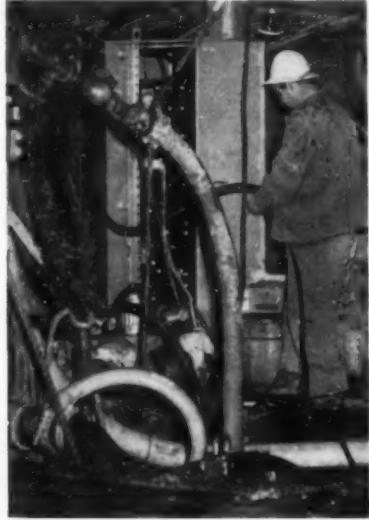
These muckers, like every piece of machinery below ground, are run by compressed air carried by U. S. Rubber's #4810 Air Hose. Two mucker machines are used per shaft, one operating at each face. The mucker cars are 5-cubic-yard cars, each holding six tons. Every foot of tunnel progress represents about two carloads worth of muck and each blast dislodges enough rock to fill 21 cars. Currently, the contractors are

AND MIRE

THE 44-MILE WEST DELAWARE TUNNEL

averaging two blasts per shift on each heading. This is pretty severe service for both the U. S. Rubber belt and the mucking machine, yet from the very start, there's been no delay in the vital task of moving the shattered rock from the face and into the mucking cars.

Just about all the rubber products used by the contractors are made by U. S. Rubber—this includes literally thousands of feet of hose—for grouting, air, water and suction—several mucker belts, and quantities of electrical tape to splice the miles of wire and cable.



Here, at the bottom of Shaft #2, is an example of the maze of "U. S." air hose, water hose, suction and discharge hose that is used throughout the tunnel. Practically every foot of hose on this job is made by U. S. Rubber.



This on-the-spot photo shows U. S. Grouting Hose to seal off a wet seam that had stopped all progress. The hose is perfectly balanced throughout, with an abrasion-resistant outer cover and multiple braids of extra-heavy wire, and a rubber liner.

Handling Water Leakage

Delays, of course, can mean real trouble for the several contractors who have combined resources on the first stage of this West Tunnel project—the \$36 million contract for Shafts #1, 2 and 3 and the headings branching out from them. For example, the 2000-gallons-per-minute wet seam that they recently encountered halted progress completely. However, quick-thinking engineering skills—and equipment that stood up under rigorous emergency service—combined to cut the delay to the bone and kept the tunnel's time schedules moving as planned.

One thing is certain . . . there is always water seepage, hour after hour,

A complete line of rubber products for the construction industry—together with expert engineering assistance—is available at any of these conveniently located U. S. Rubber District Sales Offices:

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Cleveland 3, Ohio
7200 Euclid Ave.

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100 Route 128

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Mechanical Goods Division

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AND MIRE



THE 44-MILE WEST DELAWARE TUNNEL

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This on-the-spot photo shows U. S. Grouting Hose placed to seal off a wet seam that had stopped all progress in perfectly balanced throughout, with an abrasion-resistant multiple braids of extra-heavy wire, and a rugged cover.

Handling Water Leakage

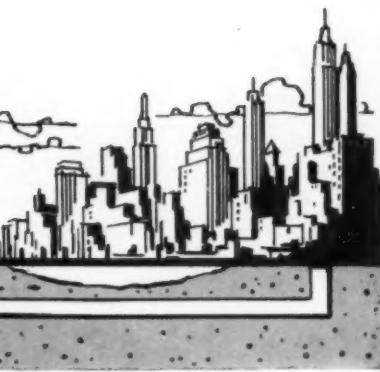
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One thing is certain . . . there is always water seepage, hour after hour,



Mechanical Goods Division

United States R



Hose placing the 16,000 bags of grout needed
in progress in the tunnel. U. S. Grouting Hose is
abrasion-resistant tube, a carcass constructed of
a rugged cover to withstand external abuse.

day after day. For the most part, this presents no serious problem. The constant leakage is pumped out with the aid of U. S. Giant® Contractors Water Suction Hose and U. S. Bengal Water Discharge Hose.

U. S. Giant Hose is particularly valuable suction hose for working in and around heavy equipment because this spring-steel hose can be rounded out when flattened or crushed. And mandrel-made U. S. Bengal Hose—with a tube of high quality rubber, a multiple-ply carcass of sturdy cotton duck, and an abrasion-resistant natural rubber cover—is the perfect water discharge hose for the heavy duty encountered on jobs like this.

For the construction industry, U. S. Rubber engineers and produces a wide variety of the following products, each specifically designed to provide top performance at lowest possible cost.

Air Hose

Water Hose

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Lubricating Hose

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Engineered Rubber Products

EXTRA! Ask your "U.S." representative for the new, free Road Construction Catalogue. It describes in detail how all "U. S." products can serve you, saving you time and money.

Rubber



AIR HOSE



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Montreal, Quebec

Deep under the Catskill mountains in South thousands of feet of air hose snake along the rock passages of the West Delaware Tunnel.

On this mammoth 160-million-dollar, 4-year job, everything below ground is run by air (except, of course, the lighting). From mud fans, from suction pumps to jumbo drills, it's air that keeps things moving. And every cubic foot of compressed air moves through U. S. Rubber Hose.

First, high-capacity U. S. Bull Line Hose is run to the working faces. Then, U. S. 4810 Air Hose carries compressed air to the many types of equipment.

Because of their outstanding performance,



U. S. RUBBER PRODUCTS



**Mechanical Goods Division
United**

R HOSE



The Air that keeps things moving!

in Southern New York,
along the wet, jagged
Tunnel project.

ollar, 4-year construction
run by compressed air
from muckers to exhaust
drills, it's compressed air
every cubic foot of com-
rubber Hose.

Line Hose carries the air
810 Air Hose moves the
of equipment.

performance records U. S.

Bull Line and U. S. 4810 Air Hose were selected by the several contractors involved. Both hose have covers of tough, pure-gum rubber to resist the severe abrasive conditions encountered. Both hose also feature neoprene tubes to combat action of oil in air lines. And between cover and tube, both Bull Line and 4810 have kink-resisting carcasses, each engineered for greatest hydrostatic values.

For all construction requirements, a complete line of rubber products—plus expert engineering assistance—is available at the 28 U. S. District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co., Ltd.



PRODUCTS AT WORK ON THE 44-MILE WEST DELAWARE TUNNEL

Goods Division

United States Rubber



AIR HOSE



It's the Air that keeps things moving!

Deep under the Catskill mountains in Southern New York, thousands of feet of air hose snake along the wet, jagged rock passages of the West Delaware Tunnel project.

On this mammoth 160-million-dollar, 4-year construction job, everything below ground is run by compressed air (except, of course, the lighting). From muckers to exhaust fans, from suction pumps to jumbo drills, it's compressed air that *keeps things moving*. And every cubic foot of compressed air moves through U.S. Rubber Hose.

First, high-capacity U. S. Bull Line Hose carries the air to the working faces. Then, U. S. 4810 Air Hose moves the compressed air to the many types of equipment.

Because of their outstanding performance records U. S.

Bull Line and U. S. 4810 Air Hose were selected by the several contractors involved. Both hose have covers of tough, pure-gum rubber to resist the severe abrasive conditions encountered. Both hose also feature neoprene tubes to combat action of oil in air lines. And between cover and tube, both Bull Line and 4810 have kink-resisting carcasses, each engineered for greatest hydrostatic values.

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In Canada, Dominion Rubber Co., Ltd.



U. S. RUBBER PRODUCTS AT WORK ON THE 44-MILE WEST DELAWARE TUNNEL

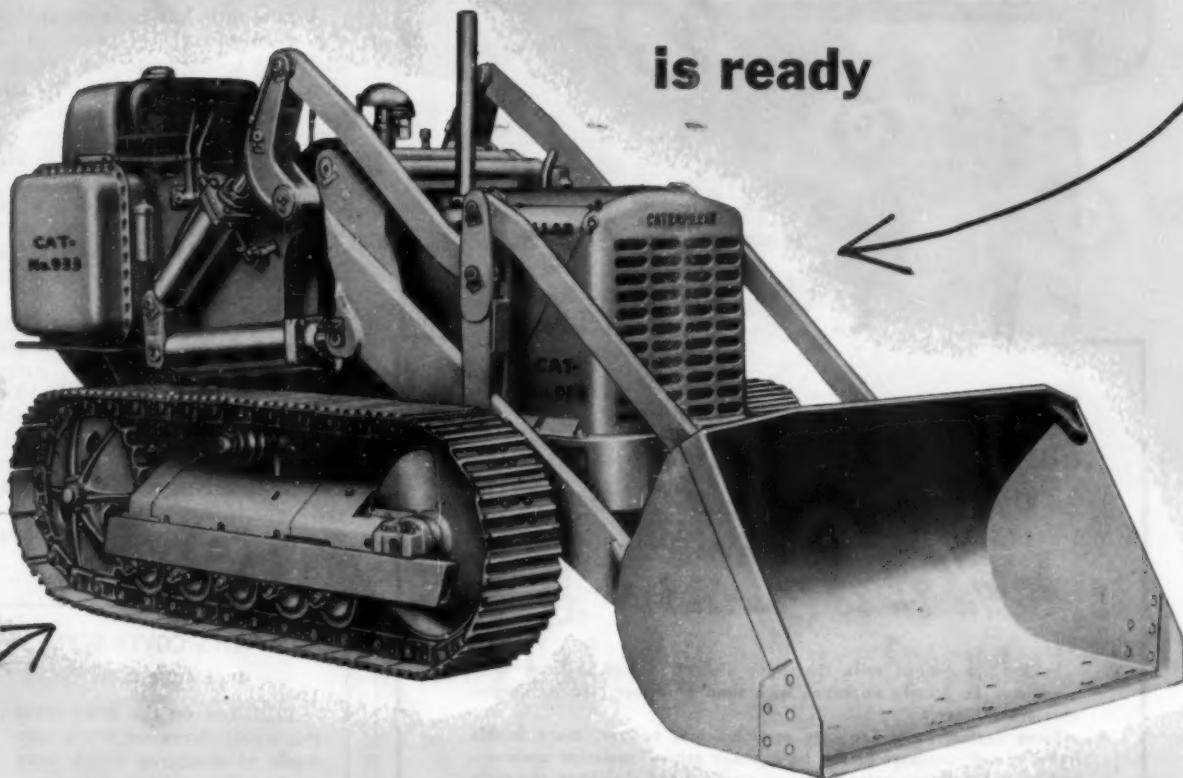


Mechanical Goods Division

United States Rubber

ANNOUNCEMENT! The new, improved

No. 933 (Series E) TRAXCAVATOR*



with longer life, lower maintenance!

Looks a lot like the popular No. 933 you already know—but there's greater stability, performance and durability built into this new Series E!

Now the rugged CAT* No. 933 Traxcavator includes a new heavy-duty undercarriage with:

- New Rugged Track Roller Frame
- New Solid Sprockets
- New Heavier Idlers
- New Tough Track Rollers

The easy operation, the great capacity and the dependable power—these features remain as outstanding as before.

For complete details on this *tough* new Traxcavator, call your Caterpillar Dealer. He'll be glad to give you full information on the complete line of Cat-built Traxcavators. He's the man to remember, too, for expert service and for replacement parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

The complete line of Cat-built Traxcavators

	No. 977	No. 955	New No. 933 (Series E)
Flywheel HP at sea level	100	70	50
Bucket capacity, cu. yd.	2½	1½	1
Bucket tip-back at ground level	40°	40°	40°
Bucket tip-back at maximum lift	46½°	47½°	48°
Dumping height (center of hinge pin to ground)	141½"	128"	119½"

... for more details circle 258, page 16

**ONE GOAL: To concentrate
our capabilities, resources and
experience on the design,
manufacture, distribution and service
of job-tested heavy equipment.**

Solve Clay Plasticity Problems WITH LIME STABILIZATION



Mixing lime and clayey base course material in secondary road job in Louisiana

**LIME SHARPLY REDUCES PLASTICITY INDEX (P.I.)
OF UNSTABLE CLAYS, SILTS, AND CLAY-GRAVELS**

*In Subgrades
In Base Courses*

Sticky, fine-grained soils, that have always plagued highway engineers, can be greatly improved with lime as determined by simple, standard P.I. tests.

Lime agglomerates fine clay particles into coarser, more friable fractions and increases plastic limit above critical moisture content—and in so doing, eliminates damaging swelling and shrinkage, the main cause of base and subbase failures.

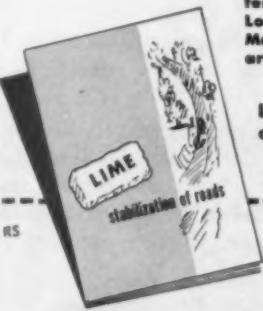
P.I. of raw soils have been reduced from 15-50 to 6-15 with only 3% of hydrated lime (by weight) on basis of many actual projects.

OTHER BENEFITS—Lime invariably increases the strength (bearing value) of the subbase or base course as determined by CBR and stability tests.

Low Cost — Expedites Construction — Reduces Maintenance — Enables Utilization of Substandard Base Materials.

Lime stabilization — 10 to 12 years successful durability experience—over 1000 miles constructed.

Write for further information and FREE booklet:
"LIME STABILIZATION OF ROADS"



NAME _____

POSITION _____

AFFILIATION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

NATIONAL LIME ASSOCIATION

925 15th STREET, N.W. WASHINGTON 3, D.C.

... for more details circle 313, page 16

Headlines

State Department Group to Work With Consultants

A new unit has been created in the Pennsylvania department of highways to expedite the preparation of construction plans by contract engineering firms and to assist district engineers in checking specifications and standards. E. E. Gilham is in charge of a staff of six qualified engineers assigned to assist in the work.

Formation of the new group is in line with the department's announced plans to modernize its set-up to efficiently handle the growing federal aid and state construction programs. Coordination of contract engineering plans, formerly handled by the district engineers, now becomes the responsibility of the new unit. Conferences which were formerly held in the central office and which necessitated frequent trips by district personnel, consult-

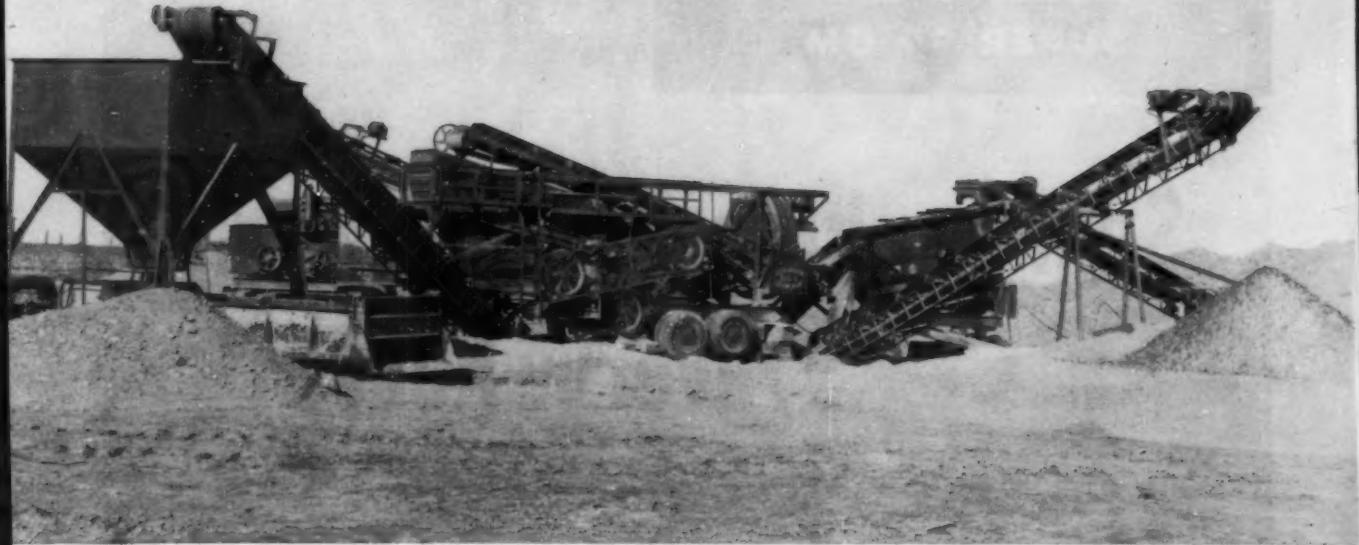
(Continued on page 29)

MONTH'S COVER SCENE

Is this a record?

The scene on the front cover this month shows one of the hundreds of machines which were used on the various paving contract sections of the Kansas Turnpike during the 1956 season. The unit pictured, an Adams motor grader, was doing edging on flexible base clean-up as part of the operations of Amis Constr. Co. of Oklahoma City, Okla. The various contractors' collective efforts built up to an August peak in which 2,127,000 tons of paving aggregates was placed along this 236-mile road in a single month. This tonnage included all subbase and shoulder stone (but not paving aggregate) for the 56-mile concrete-paved section and all aggregates for subbase, base, shoulder and paving for the 180 miles which were asphalt-paved.

The material totaling 11.2 million tons for the entire turnpike was placed largely in a 6-month period, and 80 percent of it was done by October, in what is believed to be the largest one-season paving program for any of the turnpikes in the postwar boom.



Portable A-W plant producing base material for large state highway job near Los Banos, California.

AUSTIN-WESTERN Crushing Plant produces rock at low cost for Richards-Underdown Co., Fresno, Cal.

High output and low cost—that's the story on the Austin-Western 101-S Crushing Plant working for one of the biggest producers in the San Joaquin Valley. Despite its large capacity, it can be moved easily and fast from job to job.

In the operation shown above, feed material is scalped ahead of the crushing plant to remove fines and produce minus $1\frac{1}{4}$ inch material. Feed over the scalper goes to the primary crusher, which has a 1036 jaw. It then passes into the big 30 x 20 inch roll crusher, which turns out a $\frac{3}{4}$ inch plant-mix material. The plant has three conveyors, which deliver sand and road-base material in sizes of 1 inch and minus $\frac{3}{4}$ inch.

The plant is powered by a 62.5 kva generator, driven by a diesel engine. The individual motors operate the conveyors and the scalping screen through short-coupled V-belts—there are no idlers, clutches, etc., to cause mechanical loss. The crushing plant itself is direct-diesel-driven by a propeller shaft. A single convenient push button station controls the entire closed-circuit system.

There's a high-speed, profit-making Austin-Western Plant exactly right for your needs. Call on your nearest distributor for full information. Or write Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

COMPARE—AND YOU'LL WANT AN AUSTIN-WESTERN CRUSHING PLANT

1. *Welded steel plate frame for high strength without weight of cast steel frame.*
2. *Machined steel toggle plate for absolute protection, instead of cast iron.*
3. *Inclined positive-throw-type vibrating screen.*
4. *All moving screen parts operate in rubber bushings that need no lubrication.*
5. *Dual rear wheels for added stability; fully enclosed brakes on rear tandem.*
6. *Oversize self-aligning spherical bearings in crusher.*
7. *Heat treated chrome vanadium steel shaft in crusher.*

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

... for more details circle 246, page 16

AUSTIN-WESTERN
CRUSHING, SCREENING AND WASHING EQUIPMENT



BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

OLIVER

SUPER 99 GM

Scoring high in road work ...everywhere!



HERE'S WHY:



The Super 99 GM is the most powerful wheel tractor of its type.

This rugged 4-wheeler has the massive strength throughout for heavy load-lugging. With the popular General Motors 371 Diesel it delivers a full 77 drawbar h.p.—plenty for pulling scrapers, dump wagons, scarifiers, sheep's-foot and pneumatic rollers, scraper planes, etc.

Here's rubber-tire mobility with 6-speed transmission...ground-gripping traction at $2\frac{1}{2}$ m.p.h. where the going's rough...speeds up to $13\frac{1}{4}$ m.p.h. for the long hauls. The Super 99 GM can replace heavier, costlier equipment in many cases. At the same time, it eliminates the risk of overloading medium-size tractors. Here's one prime mover sized right for every job.

Users report the Super 99 GM a big money saver on every score—fuel economy, easy servicing, freedom from repair bills. Best of all, it's priced for the small budget. Ask your Oliver distributor. Or write for Bulletin I-702.



THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors and matched allied equipment

... for more details circle 315, page 16

ROADS AND STREETS, June, 1957

Headlines

(Continued from page 26)

tants and Bureau of Public Roads officials to Harrisburg, will be conducted in the district offices. This will eliminate costly delays and will result in speedier decisions on problems which arise during the construction planning and design stage of projects.

The primary function of the unit is to guarantee that all construction plans developed by contract are prepared in accordance with department standards and specifications. It will also be responsible for maintaining production schedules.

The personnel will keep in touch with contract engineering staffs to check progress and to advise and consult with them on all department design procedures. Weekly reports will be submitted to district engineers and to the central office on the character and degree of progress made on assigned projects.

Decisions which previously were referred to Harrisburg will be determined at conferences in the district involved, or at one of the three designated coordinator's offices.

Developments in Union Labor

The AFL-CIO unions are moving into the highway field "by fair means or foul—whichever they find most effective," reports an eastern contractor association. A bulletin from this association to its members notes that recently three units of this union, the Operating Engineers, Teamsters and Laborers, had drawn a contract especially designed for highway contractors.

"Some of the rates are out of line," continues this bulletin, "but many of them are reasonable. The union is soliciting signers and has already secured some of the contractors in New Jersey who do work on the turnpike and state roads."

Under the Davis-Bacon act, this bulletin notes, these unions have only to secure 30 percent of the contractors in an area and the union rates will prevail. One of the association's member contractors doing work in both the building and the highway field reports that a strike has been started on his unionized building operations in an effort to have the management sign the highway union agreement.

(Continued on page 36)



Prevent Expansion Joint Leakage

ALLIED JET SEAL

Even the most modernly engineered and constructed bridges are vulnerable to costly repairs and maintenance. If moisture is allowed to infiltrate through the expansion joints, bearings and other load bearing members will soon rust out as in the picture above.

Allied JET SEAL is the perfect solution to this problem. It is extremely rugged and long lasting . . . has superior qualities of adhesion, cohesion, resilience and ductility at low temperatures. Allied JET SEAL has no cold flow tendencies even at temperatures in excess of 300°F., giving assurance that it will not drop out of vertical construction joints.

Allied JET SEAL is truly the ultimate for sealing bridges, streets, highways and runways.

Jet Fuel, Heat and Blast Resistant Seal for Airports

Allied JET SEAL will not be blown from the joints by the blast and heat of jet engines even after prolonged exposure. Nor is Allied JET SEAL affected by jet fuel, oil and solvents.

ALLIED
MATERIALS CORP.

PRODUCERS, REFINERS
AND COMPOUNDERS
FOR OVER 25 YEARS

GENERAL OFFICES—Braniff Bldg., Oklahoma City, Okla., Phone RE 9-0592
PLANTS—Stroud, Okla.—Detroit, Mich.—Los Angeles, Cal.—New Market, N. J.
Brampton, Ontario (Canada)

... for more details circle 234, page 16

**ONLY YOUR
International distributor
can make this deal:**

**Four-
for**

**Buy your job-sized
4-In-1 on tracks or
rubber from a
complete line of
profit-producing rigs.**

Now—why tie-up useful money or “strap” your credit by “over-equipping”? Why spend upwards of four times as much for several limited-duty machines which one 4-In-1 can replace—and outproduce?

An International Drott 4-In-1 gives you 4-machine usefulness for one moderate investment. Yes, the exclusive and revolutionary 4-In-1 gives you instant availability of 4 big-capacity machine actions!

You get world-beating Skid-Shovel excavating—

All-in-1 International Drott 4-In-1

“Carry-type scraper”

with “see-easiness” of front-mounting—
to grade, strip, spread, or compact with
amazing, inch-close accuracy!



Skid-Shovel...

with Drott's exclusive, “concrete-smash-
ing” triple-power pry-action break-out—
and 42° ground-level bucket roll-back!



machine job-capacity One-machine price!

loading performance. You get exclusive multi-purpose "carry-type scraper" action. You get production-boosting clamshell action. You get "radius-controlled" bulldozer action with big-yardage earth-rolling ability!

You get 4-In-1 versatility unlimited for a fraction of the price of the machines it can replace and outperform, on job after profitable job!

And you can have 4-In-1 advantages teamed with all-condition International crawler traction, or rubber-

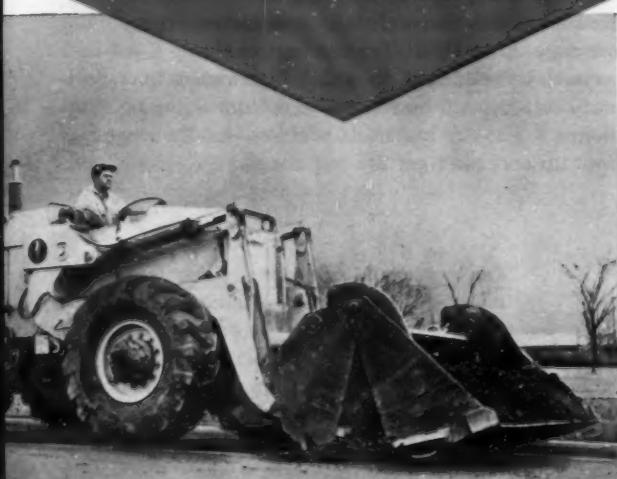
tired Hough Payloader speed!

See your *International Distributor*—he's the only one who can offer you a 4-In-1 deal! He's the only one who can save you the thousands of dollars that 4-In-1 ownership assures—by giving 4-machine utility for one moderate investment. And he can prove the "heap of difference" in 4-In-1 performance on tracks or rubber—against anything else in the field! See him soon for a demonstration!

gives you...

Clamshell...

that "surrounds" loose materials and fills in one fast gulp—gives you "hopper-high" self-cleanout dumping action.



Bulldozer...

with clam lip up, and skid shoes on the ground, the radius-controlled blade rolls the earth with precision!



ONLY YOUR
International distributor
CAN OFFER THESE
EXCLUSIVE FEATURES!

Here's
job-range.



**Exclusive triple-power
pry-action break-out**

Inbuilt ability to deliver tremendous excavating force enables this TD-9 4-In-1 to yank out deeply embedded old masonry piers. You see typical, on-the-job advantages of true and exclusive International Drott pry-over-shoe break-out action—the only design that gives you the three absolute essentials: (1) Full hydraulic power transfer from full piston-face power-push; (2) Long lever to apply full pry-power; (3) Fixed fulcrum of frame-mounted skid-shoes, to concentrate pry-force!



**Exclusive parallelogram
raise action**

No eccentric tipping to cause spill-back and lose yardage! The 4-In-1 has non-spill, roll-back level—all the way up. Compared to ordinary front-end loader performance, this feature, alone, can increase your daily yardage up to 18%! You can bottom-dump the 4-In-1 as a clamshell...and do it 2½-foot higher than ordinary roll-forward buckets. And bottom dumping eliminates the sticky materials problem—where other rigs foul up and can't get the job done!

**Check these other famous
International Drott Exclusives!**

● **STANDARD EQUIPMENT.**
Three-valve design, to provide
hydraulic control power for at-
tachments.

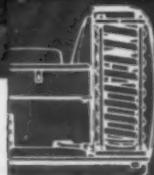
● **STANDARD EQUIPMENT.**
Double-bottom, bridge-truss
bucket to insure 4-In-1 strength
to match pry-action.

● **STANDARD EQUIPMENT.**
Yoke-type supports to insure
linkage strength to back 4-in-1
capacity!

● **STANDARD EQUIPMENT.**
Magnetized dip stick to prevent
damage to hydraulic system
from minute abrasives!

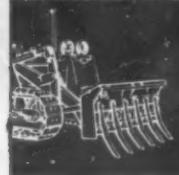
Only your International Distributor can offer you the big money-making advantages of International Drott exclusive 4-In-1 features. Only he can deliver you job versatility unlimited, in the world's only multi-purpose machine of its type! Prove to yourself that your correct size of 4-In-1 can replace and outperform a whole machinery yard full of limited-duty rigs. Ask for a demonstration!

where 4-in-1 gets world-beating capacity... stay-put performance!



Exclusive shock-swallowing Hydro-Spring

Capacity-boosting, machine-protecting Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty locomotive-type coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads. Slamming the 4-In-1 bucket into hard material—"dozing frozen ground—dumping rock with a bang—you never worry! Hydro-Spring gentles trouble-causing forces by two-thirds or more—practically eliminates hydraulic hose failures!



Complete line of attachments

Job-getting, money-making attachments built for specialized duty, provide tree-grubbing, boulder-bucking, log-loading performance available only from International Drott equipment! Grubber Blade attachment, used in place of the 4-In-1, is shown applying the tremendous force of pry-action break-out—to uproot a tough old oak tree. Other special attachments built to extend International Drott advantages to other fields include: Rock Forks, Skid-Grapples®, Bulldozer and Bullangledozer blades!

CHOOSE FROM

four 4-in-1 sizes

TRACTOR SIZE	4-IN-1 CAPACITY
TD-6	1-YARD
TD-9	1 1/2-YARD
TD-14	2 1/4-YARD
TD-18	3-YARD

International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.
Drott Manufacturing Corp., 3126 South 27th St., Milwaukee 15, Wis.

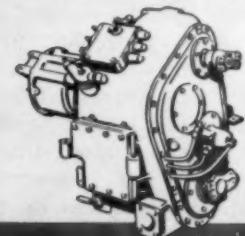


INTERNATIONAL
DROTT®

ONLY
your International distributor
can give you 4-in-1 Performance
ON RUBBER!



NO-STOP POWER SHIFT



One lever makes all shifts forward and reverse under full throttle — no clutching, no stopping. Torque converter provides infinite speed ratios.

PAYLOADER® mobility

PLUS four-machine utility

The only rubber-tired tractor-shovels available with Drott 4-in-1 buckets

Now you get even more tractor-shovel performance when you buy a "PAYLOADER". Equipped with a Drott 4-in-1 bucket, your "PAYLOADER" can handle many jobs that other wheeled tractor-shovels can't touch . . . perform shovel, clamshell, scraper or bulldozer work that would otherwise require several separate machines.

With a Drott 4-in-1 on a "PAYLOADER" you also get:

MOBILITY — quick-to-job travel over streets or highways under its own power . . . ability to work on or off paved surfaces.

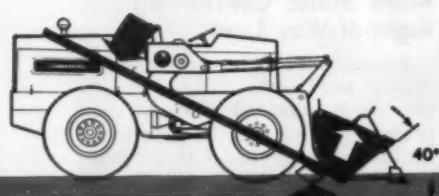
MANEUVERABILITY — easy operation and fast

loading cycles because of responsive rear-wheel power steering, "no-stop" finger-tip power shifting, dependable 4-wheel power brakes.

BALANCE AND STABILITY — long wheelbase . . . hydraulic load-shock-absorber . . . low, close bucket-carry position, all contribute to the easier riding qualities, the higher carrying speeds and the unusual balance that are outstanding "PAYLOADER" operating advantages.

TRACTION AND DIGGING POWER — exclusive power-transfer differentials, planetary final drives and the powerful pry-out bucket digging action help these "PAYLOADER" units to outperform other tractor-shovels of comparable size. Your International Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels with a Drott 4-in-1 bucket can do for you. Ask him about the "PAYLOADER" Deferred Payment Plan.

PRY-OUT DIGGING ACTION



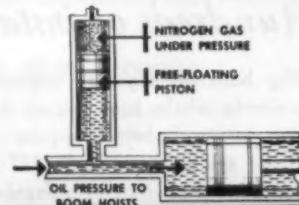
Exclusive "PAYLOADER" bucket action combines a powerful prying force over "break-out" pads, with 40° bucket tip-back at ground level to get heaped loads into bucket quickly and easily.

POWER-TRANSFER DIFFERENTIALS



These special differentials give better traction under all conditions — automatically deliver 25% more power to the wheels with the better traction.

LOAD SHOCK ABSORBER



This important device is a part of the hydraulic system. It cushions the loaded bucket, smooths the ride, permits faster carrying speeds, reduces spillage, boosts

All three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, models HU, HH and HO, are available with Drott 4-in-1 buckets, sizes 1, 1½ and 2½ cu. yd. respectively.

THE FRANK G. HOUGH CO.

768 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" model HU HH HO with Drott 4-in-1 bucket to:

Name

Title

Company

Street

City

State

90



PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO., LIBERTYVILLE, ILL.
SUBSIDIARY-INTERNATIONAL HARVESTER COMPANY



... for more details circle 289, page 16

Vari-Typer speeds up highway drafting jobs

No more costly hand lettering...



Vari-Typer does the job

4 TIMES FASTER!

*Letters tracings even 12 feet or more wide
Hundreds of instantly changeable type faces*

Why hold up highway engineering projects while high-priced draftsmen do simple lettering jobs? Your office typist...using a Vari-Typer...can do lettering 4 times faster!

The Vari-Typer Model E-24 composing machine is specifically designed to give clean, crisp lettering on drawings, specification sheets, bills of material, etc. It accommodates cloth or paper tracings even

12 feet or more wide. Type faces are instantly changeable (many available with engineering and mathematical symbols). The Vari-Typer is easy to operate....your office typist can learn it quickly. Save valuable draftsmen's time....speed up all types of engineering jobs. Ask your nearby Vari-Typer man for a free demonstration, or write Dept. E-24 for a free bulletin.

Text of this advertisement by Vari-Typer, Headlines by Headliner.

Vari-Typer

VARI-TYPER CORPORATION

720 Frelinghuysen Avenue, Newark 12, New Jersey
Subsidiary of Addressograph-Multigraph Corporation

... for more details circle 360, page 16

Headlines

(Continued from page 29)

The spread of this practice is feared by this association as a development which is part of a pattern being watched with mixed feelings by various segments of the highway industry and highway department leaders over the country.

California Users Conference Adopts Policy Statement

Over 700 bills affecting highway users are now under consideration by the California legislature, members of the California Highway Users Conference were informed at a recent meeting. Conference chairman Allen F. Mather called attention to the fact that 75 bills would add in excess of 3,000 miles to the state highway system, 10 bills would change the laws relative to the location of highways, 22 measures have to do with the acquisition of rights-of-way, 19 bills would affect the vehicular size and weight laws and three proposals would divert highway funds to other purposes.

In view of this situation, the conference approved a seven-point policy statement containing recommendations regarding additions to the state highway systems, a state-wide plan for freeway development, non-technical progress reports to the public, acquisition of rights-of-way, vehicle sizes and weights, responsibility for preparing the state highway budget and opposition to the diversion of highway funds.

Many States Considering Right-of-Way Laws

An overhauling of highway right-of-way acquisition laws and procedures is expected to make good progress during 1957 as a result of action being considered in many state highway departments. According to a roundup released by National Highway Users Conference, such measures have been introduced in 21 states, aimed at providing faster and in some cases less costly acquisition procedures.

Fourteen states already have specific statutory authority to acquire lands for future highway rights-of-way, thus permitting acquisition before property is developed, with resultant savings. Bills to provide for such authority are in the hopper in Arizona, Indiana and Kansas.

Fast-Acting Bladework



HUBER

WARCO

5D-190 MOTOR GRADER

The Huber-Warco 5D-190 offers fast-acting bladework, with no clutchwork. The combination of a 195 h.p. diesel engine, torque converter, power-shift transmission and tail-shaft governor, team up to enable the operator to make faster passes and smoother cuts. See your nearest Huber-Warco distributor for details.

HUBER-WARCO COMPANY
Marion, Ohio

MF THE ALL NEW WILLIAMS DIGGER

- NEW HEAVY-DUTY TRANSMISSION
- TWO-SPEED POWER CROWD
- ANTI-FRICTION BEARINGS ON ALL SHAFTS

The Williams MF Foundation Digger incorporates, on a small scale, all of the "tried and proven" design features which have made the LDH the perennial favorite of drilling contractors everywhere.



LDH FOUNDATION DIGGER

The Williams LDH Foundation Digger has broken all records for performance, dependability, durability and economy. For fast, efficient drilling of large-diameter holes up to 55 feet deep the LDH is without equal.

Distributed by
JOSLYN MFG. & SUPPLY CO.
 Offices in Principal Cities



HUGH B. WILLIAMS MANUFACTURING CO.

8330 Lovett Ave. • Dallas, Texas
 Phone EVergreen 1-2118



... for more details circle 346, page 16

Personals

**Thomas H. MacDonald Dies;
 Former BPR Chief**

(See also page 118 this issue)

Thomas H. MacDonald, who served as chief of the Bureau of Public Roads or its predecessor organizations for 34 years, died in retirement in Texas April 7 at age 76. At the time of his death he was serving as a consultant for Texas A. & M. College, where he held the title of "Distinguished Research Engineer."

Mr. MacDonald, who retired in 1953, was saluted by Sinclair Weeks, secretary of commerce, as "Mr. Public Roads." His tenure of office during the emergence of the highway system from the mud road days was an astonishing one in the Washington scene, where "bureaucrats came and went" while MacDonald and his policies weathered innumerable political storms.

During MacDonald's third-of-a-century in office, the federal-state relationships were maintained under a long succession of congressional enactments which gave us our state highway systems as we have them today.

When MacDonald retired he was quoted as saying, "I think that the role of the federal government is not to dictate to the states or cities or counties but through the state legislatures and their highway departments to help their cities and their counties in the administration of their work."

President Truman awarded MacDonald the Medal of Merit for his road building activities in World War II. He was decorated by France, Norway and Czechoslovakia. His honors here in the United States were many.

Since 1953, he had headed the Highway Research Center at Texas A. & M. College Station, Texas.

KENNETH E. FOWLER has been appointed division engineer at Kansas City for the Corrugated Metal Pipe Association and will serve the association in Kansas, Missouri, Nebraska and Iowa.

ROBERT K. LOCKWOOD has been appointed assistant to the executive secretary, American Society of Civil Engineers. For the past several years
(Continued on page 44)



Simple,
low-cost
CORRUGATED
metal pipe

Culvert on New Kensington, Pa. by-pass. Fabricated from USS Galvanized Corrugated Culvert Sheets by United Steel Fabricators, Inc., Wooster, Ohio. Installed by Adam Eidemiller Construction Company, Greensburg, Pa.

stands up under heavy loads!

Structures made from USS Galvanized Corrugated Culvert Sheets provide a permanent, speedy and economical means of handling road and highway drainage problems. They readily absorb the impact and vibration of modern traffic and can carry heavier loads than rigid-type structures.

These advantages, plus the fact that corrugated metal culverts are

not subject to breakage, require no maintenance, cost less to install and are easy to ship and handle, make them ideal for most drainage applications.

For larger drainage structures

USS AMBRIDGE SECTIONAL PLATE is available in a complete range of standard sizes to satisfy design requirements for various types of ter-

rain and waterway openings. These flexible structures with their heavy-duty corrugations can resist extremely large externally applied loads.

For detailed information, ask for a copy of our 28-page catalog. Send your request to American Bridge Division, U. S. Steel Corporation, Room 1801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS GALVANIZED CULVERT SHEETS

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

... for more details circle 342, page 1



7-1004

UNITED STATES STEEL



Work Bulls pay off

on every construction project



Work Bulls provide the right tractor power with design-integrated attachments to build profit on these and scores of other jobs!

42 hp

**DAVIS
PIT BULL**

(far left) is equipped with hydraulically controlled $\frac{1}{2}$ -yd. loader. Broom, blades, swinging crane or fork lift can be mounted on same loader frame and arms. The Pit Bull features a torque converter and combination foot feed and reversing clutches as standard equipment.

34 hp

**WORK BULL
MODEL 202**

(center) with rear-mounted post hole digger that digs perpendicular holes even when working on slopes. PTO driven, the attachment can be used with either 8 or 12" augers. Other rear-mounted attachments include the Model 185 backhoe, reel and rotary mowers, multi-purpose blade and a pipe and cable layer. Front-mounted attachments include loader, blades, broom and fork lift.

52 hp

**WORK BULL
MODEL 404**

(left foreground) is biggest, most powerful tractor in line. Available with gasoline or diesel engines it has five forward speeds and optional power steering. Model illustrated is equipped with low, direct-thrust $\frac{1}{4}$ -yd. loader and a fingertip-operated hydraulic backhoe which handles 12 to 36-in. buckets, digs to depth of $12\frac{1}{2}$ feet.

...as primary equipment

Work Bulls put former hand work on a paying power basis. With five tractors (34 to 52 hp)—choice of 20 *switch-in-a-smoke-break* attachments—Work Bulls pay off on small, scattered work-and-run jobs... earn their keep off-season, too, removing snow or handling other similar jobs.

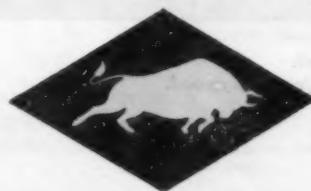
...as backup machines

With Work Bulls you get the exact power/equipment cost ratio the job demands... increase equipment scheduling efficiency... cut down overhead. Work Bulls move from site to site through city traffic or cross-country... without permit troubles, without flatbed and other costs.

...as utility or cleanup tools

When you're using shovels to clean up spill in the loading area, scrapers to smooth out haulroads, crawler dozers to pull wagons or skid light and medium-weight machinery—there's a profitable place for Work Bulls on your job. In fact Work Bulls help make your "big stuff" more profitable.

Work Bulls have a profitable place on every project. Check to see which of the 5 tractors (34 to 52 hp) and 20 easily interchangeable attachments you need. Write for free 24-pg. catalog and the name of your Work Bull distributor.



M·H·F WORK BULLS

Division of Massey-Harris-Ferguson, Inc.

19-F Quality Avenue

Racine, Wisconsin

... for more details circle 311, page 16

ROADS AND STREETS, June, 1957

Highway viaduct demonstrates **Three
of fir plywood**



*Fir plywood solved complex form problem on Alaskan Way Viaduct.
The $\frac{3}{4}$ mile double-decked structure required only 400,000 square feet of plywood.*

key advantages concrete forms

1. time and labor savings

On this six-lane Seattle highway viaduct, standardized fir plywood form sections helped complete the job months ahead of schedule. Fir plywood forms were used for beams, girders and road slabs.



Beam and girder bottom forms were built up inside standard vertical form panels in what contractors called "floating beam bottoms," to handle variable beam and girder depths.

2. economy through re-use

About 400,000 square feet of $\frac{5}{8}$ " fir plywood was required for the $\frac{3}{4}$ mile double deck structure. Contractors reported an average of four re-uses. About 25% of the fir plywood forms gave 10 uses.



Pattern of plywood forms for girders and cross beams is shown here. Standard panels for shallow cross beams and shallow center beams were not as high as those for girders.

3. smooth, fin-free concrete

The smooth surfaces obtained with the plywood forms cut finishing to a minimum, the contractor reports. Job Superintendent John Rumsey, Jr. says: "Fir plywood solved a complex form problem for us and speeded work all along the line."



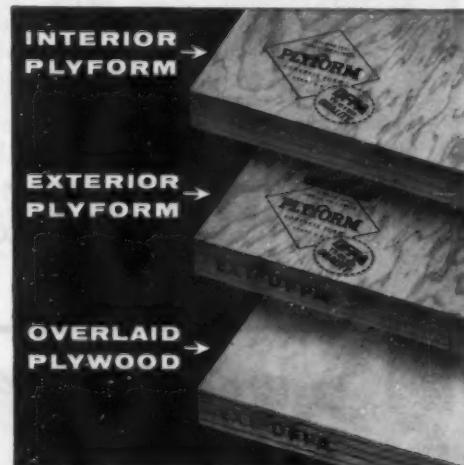
ALWAYS SPECIFY BY DFPA GRADE - TRADEMARKS

INTERIOR PLYFORM®—standard concrete form grade made with moisture-resistant glue. Gives multiple (10-12) re-uses.

EXTERIOR PLYFORM®—standard form grade made with waterproof glue. Gives maximum (25 or more) re-uses.

OVERLAID FIR PLYWOOD—special panel with hard, glossy fused resin-fiber surfaces. Waterproof glue. Up to 200 re-uses.

FOR YOUR FILES: Complete application-specification-design portfolio assembly. Write (USA Only) Douglas Fir Plywood Association, Tacoma 2, Washington, Dept. 139.



ALASKAN WAY VIADUCT

LOCATION: Seattle, Washington

CONTRACTORS: Morrison-Knudsen Co., Inc.
Rumsey and Company

... for more details circle 272, page 16

ROADS AND STREETS, June, 1957

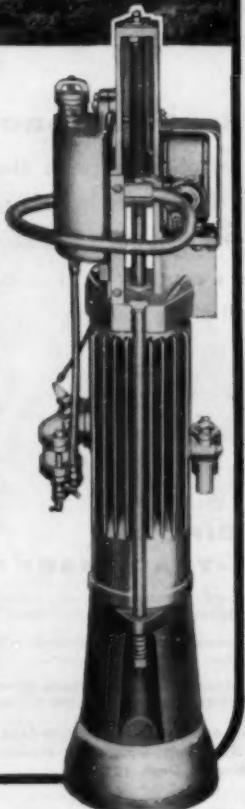
GASOLINE BARCO RAMMER



Barco Performance Pays Dividends!

Job Finished on Time!—When project specifications call for SOIL COMPACTION, Barco performance can't be beat! In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—RAPIDLY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches—on all kinds of construction jobs: Atomic Energy, Air Bases, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Bridges, Buildings, and Housing Developments. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour.

Ask for a Demonstration—We will be glad to arrange a demonstration for you; see our nearest distributor or write. **SEND FOR A COPY OF CATALOG 621.**



BARCO Manufacturing Co.

515-G Hough Street

Barrington, Illinois

... for more details circle 248, page 16

Personals

(Continued from page 38)

he has been executive editor of ASCE's magazine, *Civil Engineering*, under Walter E. Jessup, editor.

In his new post, Mr. Lockwood will coordinate the society's activities in the Department of Conditions of Practice, heretofore handled by E. Lawrence Chandler, assistant secretary.

JAMES E. POOLE, formerly general sales manager, Keystone Asphalt Products division of American-Maricetta Co., has opened his own busi-



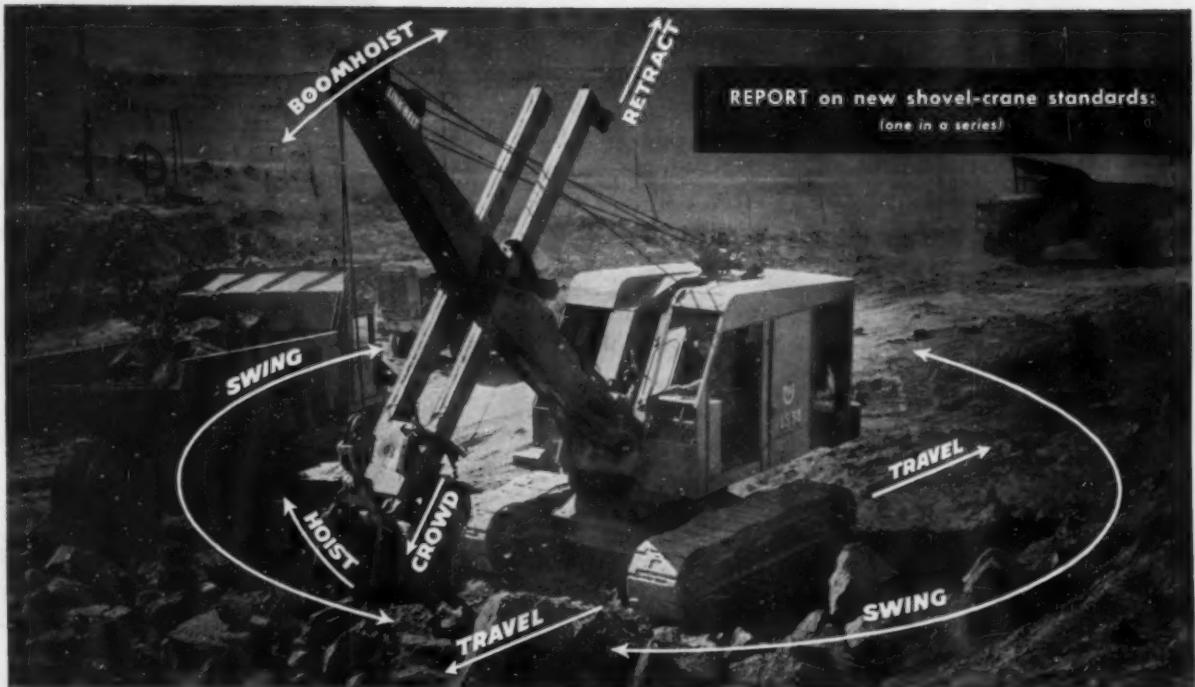
James E. Poole

ness as a manufacturers representative at 1106 N. Princeton Ave., Arlington Heights, Ill. The new venture is named "Jim Poole Construction Specialties."

ROBERT J. LOWE is named a staff editor at The Asphalt Institute. He will handle the editing and production of institute manuals and other technical publications. Lowe was formerly a technical editor with the Navy department Bureau of Yards and Docks.

H. W. HUNT has been named executive editor of *Civil Engineering*, official ASCE publication, succeeding R. R. Lockwood who has moved to the ASCE executive staff. Walter E. Jessup continues as editor.

WALTER A. HEBLER is appointed director of export sales, tractor group Allis-Chalmers Manufacturing Co., Milwaukee, Wis. He joined the A-C organization in 1933 and has served as export sales manager since 1953. Hebler joined Allis-Chalmers at its Kansas City branch in 1933 and worked later at the Des Moines and the Buenos Aires, Argentina plants.



ALL OPERATIONS ARE COMPLETELY INDEPENDENT — In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while travelling. Whether to

save time or to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

Getting 9 hours' output in 8

Independent-Swing-and-Travel is available on 11 Link-Belt Speeder models. Eliminates shifting . . . saves 20-30 seconds each move

Link-Belt Speeder users are setting new high-production standards by equipping their machines with *Independent-Swing-and-Travel*. Why? It eliminates time losses ordinarily occurring when the operator shifts from swing to travel and from travel to swing. With *Independent-Travel* shifts are eliminated and the machine can swing and travel simultaneously . . . you can jockey the boom around obstacles in tight quarters, move away from bank cave-ins in split seconds!

If you'd like complete details, proof that *Independent-Travel* can up output . . . cut maintenance and spare parts costs, too — see your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.



MORE USABLE HORSEPOWER — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.

14-354

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

... for more details circle 305, page 16

ROADS AND STREETS, June, 1957

No matter what you're doing, it makes sense to always use the *right* tool for the job. Trying to remove a big lug nut with pliers is about as inefficient as to use the same pliers to pull a cigarette from your pack. It's a case of trying to fit a *round* peg into a *square* hole.

Moving dirt profitably, on schedule, is no different. Using the *right* tool for the job . . . in place of something "second best" . . . often means the difference between winding up your contract in the red, or well in the black.

Here are a few tips on moving a lot of dirt in short order, at lowest-net-cost-per-yard. Tips to help you make sure your job foremen always "fit a square peg in a square hole" — as far as equipment assignments are concerned.

Check these pointers. Make sure you're getting the most from your equipment investment . . . and that you're using the best tool for the job!

10 TIPS...

for more profitable earthmoving

1. Prepare cut and fill areas

Every scraper on your spread will get higher hourly production if you have everything in readiness before you send them out to the project. Preliminary ground-breaking, and preparation of cut and fill areas, can be done most economically by smaller, fast-moving, highly-manueverable scrapers . . . like the LeTourneau-Westinghouse 9-*yd.* D Tournapull®. Versatile "D" speeds the pioneering phase by stripping areas

for efficient operation of production scrapers. When equipped with dozer blade, it can help clear, and do light dozing work.

You'll be fitting "a square peg in a square hole" when you assign your speedy, high-production "D" to jobs like this.

2. Shorten haul routes

The shortest distance between your cut and fill is a straight line. If no reasonably direct haul route exists,



it may pay you to team your 138 hp "D" with your pioneering tractor to carve out a new one. If extensive cuts or fills are to be made in the area, shorter cycles are important in keeping fleet production high. Every hundred feet that you can chop off your haul route will be reflected in bigger hourly yardages, moved by every scraper in your spread.

Speedy D 'Pull can also help boost fleet production by keeping haul-roads smooth. Should ruts or sink-



Use this "square peg in a square hole"

holes develop, "D" fills and levels. And on return trip to cut, "D" can drag blade, to maintain route for smooth, fast cycles by all your earthmovers. No other earthmoving tool is so well suited for all these tasks as the electric-control D 'Pull.

3. Avoid adverse grades on cut or haul

Loading or hauling uphill always slashes production. Best bet is to rearrange your cycle... or to cut down adverse grades wherever they occur... before uphill operations can eat into your profits on the job. Self-loading D 'Pull is ideal for such as-

signments. Send your "D" wherever needed to cut down grades and level off your cuts and haul routes. "D" has the speed, maneuverability, and capacity to handle such operations at lowest cost.

4. Stockpile topsoil for re-use

Another way to save time and money is to be frugal with your topsoil. Instead of just burying it where ordinary fill would do as well, you'll usually find it pays to stockpile better grade materials for re-use later. D Tournapull easily strips off choice layers... stores material nearby, yet out of the way, for future use. Saves

having to haul in imported topsoil later; when rough-grading is completed. Stripping and stockpiling can be efficiently handled by 1-man and his self-loading "D".

5. Avoid long turns, back-ups

Whenever your earthmovers have to swing wide on a slow, sweeping turn into the cut or fill, you're losing valuable production time. Where turns are necessary, make them short and tight, for real cycle economy. And make sure your scrapers don't have an awkward, clumsy approach to your pusher, or to your fill — which adds to your cycle time.

— turn page for more on "square peg D"



Square peg in a square hole!

(continued)

How D Tournapull® fills “square hole” assignments for bigger profits

It pays to clear away obstructions, widen work areas, open direct accesses with your fast-loading D 'Pull. "Handyman D" goes right to work on the problem... moves around fast to straighten curves and clean out narrow approaches. Result? Streamlined operations—with faster, shorter production cycles!

6. Divide project for efficiency

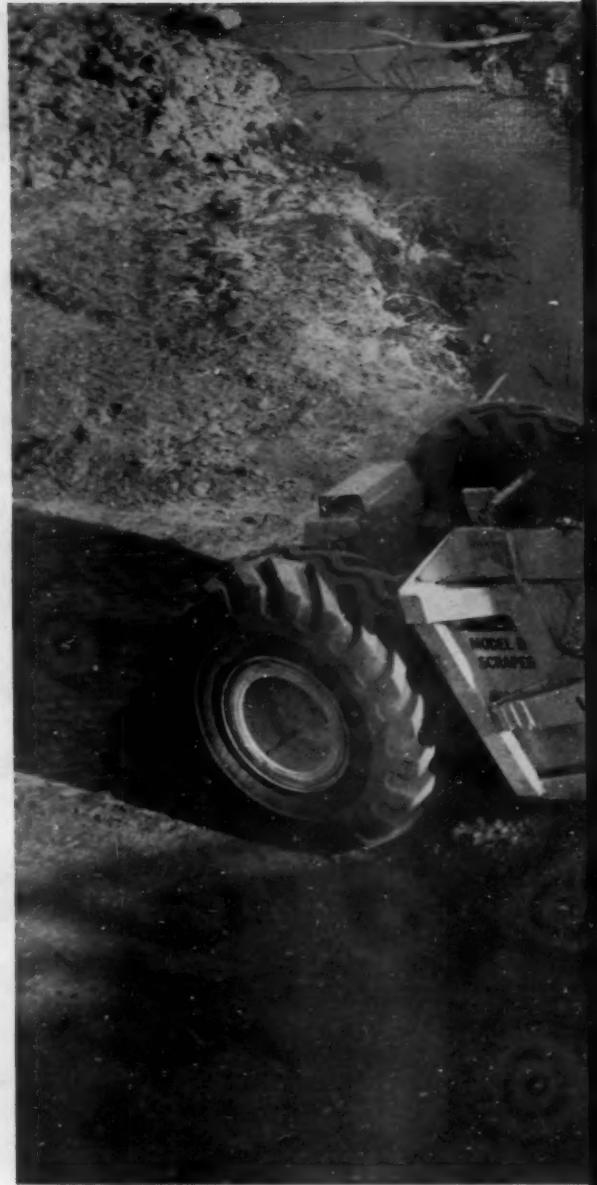
Most large projects break down into 2 or 3 localized operations—often of varying size and type. There's little satisfaction in handling 90% of the contract at a sizeable profit, if costs run far above expectations

on the remaining 10%. Be sure to pre-plan your yardage. Keep your production fleet on big sections only. Assign all scattered small-yardage portions to fast-moving "hit-and-run" dirtmovers—like this improved D Tournapull.

You'll find that dozens of "nuisance" fringe operations can be handled cheapest by this hard-working 9-*yd.* L-W scraper. Self-loaded or push-loaded, "D" heaps sizeable payloads fast... hauls on or off-road at speeds to 29.5 mph... and maneuvers easily in narrow, restricted areas. It's the square peg for all such square hole jobs.

7. Avoid scraper congestion, delays, on cut or fill

Often, as your cut or fill deepens, your cycle distances lengthen or shorten. Then you may begin to notice a pile up of scrapers on the cut and fill. Or, your pusher may sit idle much of the time, waiting for the next scraper to appear. Either condition is wasteful. With one or more "D's" in your fleet, it's a simple matter to expand or contract any localized work force. Simply call in, or pull out, a "D" to balance your operation. Either way, all units keep working productively for you without interruption.





D 'Pull makes the ideal balancer. Fast and mobile, it is equally at home on long or short cycles... as a lone dirtmover or in production operations. Hour after hour, day after day — "Square peg D" moves impressive volumes of any kind of scraper material in minimum time.

8. Keep operations flexible

As your job progresses, work conditions change. To keep earthmoving rolling efficiently, it's often necessary to shift equipment from one area — and from one type of work — to another. That's where your versatile 29.5 mph D 'Pull comes in



- turn page for more on "square peg D"



Square peg in a square hole!

(continued)

How D Tournapull® fills “square hole” assignments for bigger profits

handy. "D" easily moves from one section to another... handles pioneering, production, or clean-up work with equal facility. It serves as a roving troubleshooter — ready, willing, and able to fill in wherever needed on short notice.

9. Shouldering a specialist job

Shouldering is no job for big, awkward, wide-turning rigs. It requires careful maneuvering, and an accurate control of spread. To do a good job of it, your scraper should be able to spread a smooth, even lift — right up to the slab edge — without rutting or chewing up your fill.

With smooth-acting electric controls, D Tournapull can lay down a precision lift, accurate to within an inch. Fingertip, electric kingpin power-steer makes unit easy to

steer. Under 9-ton axle-load limit — "D" can often be routed to return over newly seasoned concrete, for faster cycles. A square peg in a square hole, you'll find "D" fits shouldering assignments to a T.

10. Clean-up method critical to profits

Clean-up operations are another critical phase of your project, where the *right* tool is all important. Too often this phase is neglected. You need adequate dirtmoving capacity to handle isolated cuts and fills efficiently. Yet you can't afford to waste a lot of time moving heavy equipment from one end of your project to the other for just a few hours' work. It doesn't pay.

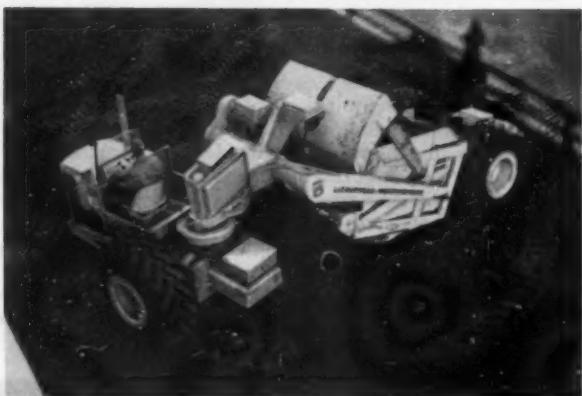
D 'Pull handles such assignments fast and economically. It's just the



ticket for sloping. And it's "a natural" for replacing stockpiled blacktop. Does a better job than your heavier, more expensive dirtmovers for construction of approaches, access roads... backfilling around culverts or overheads.

In dozens of specialized operations all along your projects, this fast 9-yd. LeTourneau-Westinghouse scraper saves you money... speeds completion of your contract... and keeps equipment investment down. Ask for detailed specifications, plus factual job reports for work like yours. Improved "D" is only 8' wide, meets 9-ton axle limit... is roadable in all 48 states without permit.

Like to see a "Square peg D" demonstrated on your job? Suggest it to your nearby LeTourneau-Westinghouse Distributor.



DP-1445-G



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 354, page 16

Add years of service to old bridge structures with



STRUCTURAL-PLATE BRIDGE FLOORING



Bridges, overpasses, viaducts and similar type crossings with symptoms of old age such as worn, rattling, wood plank flooring can be rejuvenated at surprisingly low cost with USF Structural-Plate Bridge Flooring. It installs rapidly and efficiently, in least possible "out-of-service" time. It minimizes dead load, stiffens and strengthens structure, and provides uniform support for a smooth bituminous wearing surface. Available shop fabricated to your requirements or in standard lengths for emergency stocks.

Get full details including specifications and engineering data in this free 12-page bulletin.



UNITED STEEL FABRICATORS, INC.

PRODUCTS

Hollow Metal Doors • Prefabricated Metal Buildings • Window Wells •
Highway Guard Rail • Bridge Flooring • Steel Forms for Concrete Bridge
Floors • Corrugated Metal Pipe • Sectional Plate Pipe and Pipe Arches



... for more details circle 343, page 16

Plans Issued for Highway Cost Allocation Study by U. S.

Secretary of Commerce Sinclair Weeks recently released a descriptive statement of a study designed to enable Congress to determine what taxes should be imposed by the United States, and in what amounts, in order to assure, insofar as practicable, an equitable distribution of the tax burden among the various classes of persons using the federal aid highways or otherwise benefiting from such highways.

The study, required by the Highway Revenue act of 1956, is being made by the Bureau of Public Roads under the direction of Highway Administrator B. D. Tallamy.

G. P. St. Clair, chief of the Bureau's Division of Financial and Administrative Research, and chairman of the Department of Economics, Finance and Administration of the Highway Research Board, was named to head a special group to make the study soon after the 1956 legislation was enacted.

The plan of attack is announced in a brochure entitled "Description of Plans for Highway Cost Allocation Study." It outlines the requirements for the principal problems involved in, and some of the methods of analysis to be employed in the investigation.

The study will investigate:

(1) The effects on design, construction and maintenance of federal aid highways by the use of vehicles of different dimensions, weights and other specifications and the frequency of their occurrence in the traffic streams.

(2) The proportionate share of the design, construction and maintenance costs of the federal aid highways attributable to each class of persons using such highways, the proportionate share to be based on the effects referred to in (1) above, and the benefits derived from the use of such highways.

(3) Any direct and in direct benefits accruing to any class which derives benefits from federal aid highways, in addition to benefits from actual use of such highways which are attributable to public expenditures for such highways.

Copies of the plans for the study have been sent to persons and groups known to have an interest in the study and comment invited. Persons and groups desirous of expressing their view and who do not receive a copy of the proposed plan should write to Mr. St. Clair at the Bureau of Public Roads, Washington 25, D. C.

A Size for Every Need...

in the only
Complete
Trailer Line



Athey-Cat PR21-DW21 maneuvers easily in tight quarters, handles big rock.

High-speed production on long hauls with the Athey-Cat PR15-DW15 Rear Dump.

Athey Hydraulic Ejection Trailer gives positive control in dumping and spreading loads.



ATHEY TRAILER FACTS . . .

Trailer-Tractor

	Capacity
Athey PR21-Cat DW21	34-tons, 22.5 cu. yds.
Athey PR20-Cat DW20	34-tons, 22.5 cu. yds.
Athey PR15-Cat DW15	22-tons, 15.6 cu. yds.
Athey Hydraulic Ejection-Cat DW21 (or DW20)	31-tons, 22.5 cu. yds.
Athey PD20-Cat DW20	30-tons, 22 cu. yds.
Athey PH20-Cat DW20	45-tons, 62 cu. yds.

45-tons to 22-tons — rear dump, hydraulic ejection, side dump, bottom dump — matched trailers for Cat DW21, DW20 and DW15 Tractors — *only* Athey offers you this complete line of capacities and types of high-speed haul units.

Whether it's big rock, clay, ore, mud or earth you have to move, there's an Athey Trailer matched to your off-highway operations.

The most complete materials handling trailer line is built by Athey — the leader in the trailer field for more than 34 years. Each unit is built to the rigid standards of quality construction that mean longest life and low maintenance.

This is why Athey Trailers lead the field in big production, fast dumping, easier loading, more profits. Ask your Athey-Caterpillar Dealer for information on the complete line today.

ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois.

THE *Complete* TRAILER LINE... *by the Leader*



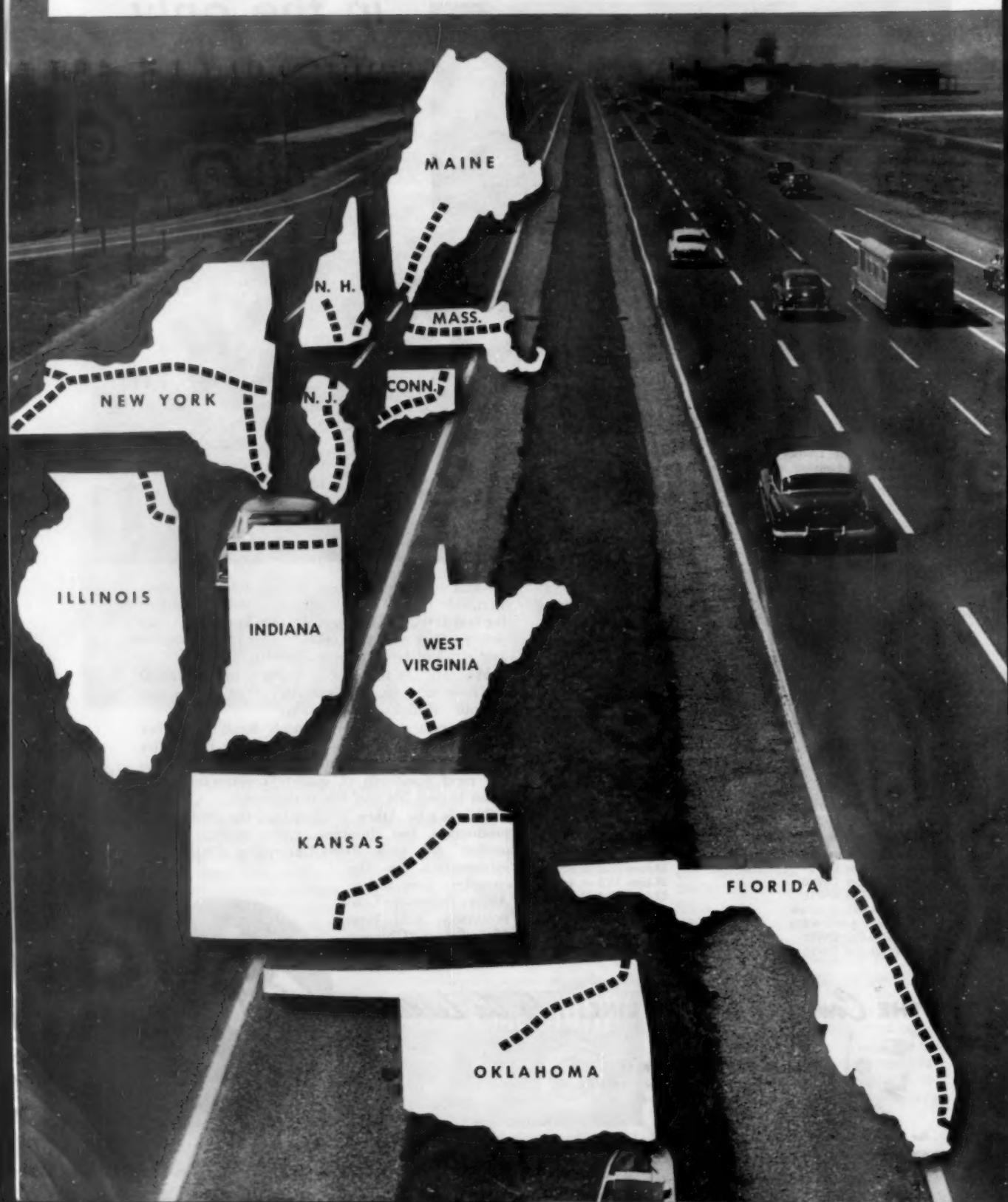
SEND FOR TRAILER BOOKLET
Just off the press — describes complete
Athey Trailer line. Write today.

... for more details circle 244, page 16

ROADS AND STREETS, June, 1957



How Liberty helped contractors



cut costs on 12 superhighways

Contractors have found that Liberty Mutual's loss prevention ideas save big money. That's why Liberty Mutual is one of the leading writers of compensation and liability insurance for highway jobs.

For instance, Liberty insured part of all 12 of the major superhighways pictured here. In each case, Liberty Mutual Loss-Prevention Engineers carefully analyzed potential hazards long before work started. As work progressed, they were constantly on the job — making test blasts; planning detours and barricades (one-quarter of all public liability cases

against contractors involve public vehicles striking barricades or equipment); advising on equipment movements; and assuring good housekeeping.

Most of the accidents reported on road jobs are the result of negligence. You can see the importance of having an alert, expert team of loss prevention engineers working with you on every job. Liberty knows how to help you prevent accidents — and that means lower insurance costs, less equipment damage, fewer idle workmen, and less down-time. It pays to insure with Liberty Mutual.

10 WAYS LIBERTY MUTUAL CUTS INSURANCE COSTS ON CONSTRUCTION JOBS



1. ADVANCE ANALYSIS, by Liberty engineers, spots and controls potential hazards before each of your projects begins.



2. ENGINEERS ON THE JOB who keep your men safe, control damage due to blasting, unsafe operating methods, etc.



3. RESEARCH by specialists in Liberty's own laboratory helps solve your difficult problems.



4. AROUND-THE-CLOCK CLAIMS SERVICE — full-time claimsmen on the bigger jobs — assures fast, fair claims handling.



5. ABILITY TO FOLLOW YOUR OPERATIONS — Liberty has branch offices in 146 cities — at your service.



6. SERVICE PERSONNEL live on large projects both here and abroad, plan and guide safety operation.



7. LARGE MEDICAL STAFF, plus two rehabilitation centers, assures the best treatment for injured men.



8. SPEEDY AUDITING service, tailored to your needs, assures proper allocation of payroll classification.



9. YOU DEAL DIRECT with company sales, loss prevention, claims and medical personnel. No middlemen.

10. INSURANCE AT LOW COST. Liberty's "expense ratio" on Compensation is lower than any general writing insurance company operating on a nationwide basis. Liberty has returned \$363,275,898 in dividend savings to policyholders.

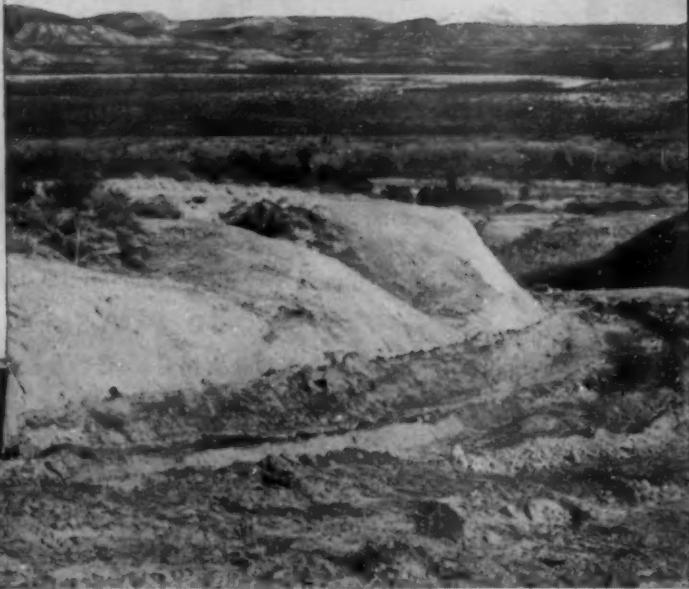
For 20 straight years — the nation's largest writer of Workmen's Compensation Insurance

LIBERTY MUTUAL

The Company that stands by you

Liberty Mutual Insurance Company • Liberty Mutual Fire Insurance Company • Home Office: Boston
... for more details circle 304, page 16

"THIS IS THE MACHINE WE'VE BEEN LOOKING FOR!"



**The D9 is not only a great bulldozer but in good material
it loads a DW21-Scraper unit in 25 to 30 seconds
for Copper State Construction Co.**

The CAT* D9 Tractor shown here is building a clover leaf on U. S. 70, some 20 miles east of Globe, Arizona. Copper State Construction Co., of Mesa, Ariz., has the 70,000-yard contract. On hauls of 1200 to 2200 feet each way, three rubber-tired rigs are handling about 4500 cubic yards per day, with cycle times of about 4½ minutes. In tough, unripped material tandem pushers are used, loading a DW21 and Scraper in about 30 seconds. Where material is better, the D9 alone does the loading job in 25 to 30 seconds.

Superintendent Roy Hale says: "This D9 is the machine we've been looking for. We like the torque converter. It gives smooth operation and will lengthen the life of the tractor."

Much of the new D9's high work output is due to its Cat Diesel Engine—the first Turbocharged engine on any track-type tractor. It now develops 320 HP at the flywheel. The D9 is available with torque converter or

... for more details circle 254, page 16

exclusive oil clutch, to suit your needs. And it offers in-seat starting, hydraulically boosted controls, smooth, constant power drive for cable controls and excellent operator visibility. It's as easy to handle as many smaller tractors.

See your Caterpillar Dealer and let him prove that this "King of the Crawlers" can do more work at lower cost on *your* job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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WILL DEMONSTRATE

ROADS AND STREETS

MAINTENANCE AGGREGATE

Supplied by Contract on Area Basis

Typical contract for Montana state highway department supplied district needs at various locations and involved brief stands of portable equipment.

MAINTENANCE-by-contract is a growing practice on state highway work. In northwestern Montana it takes the form of contract-supply of stone materials needed for maintenance and repair.

To serve highway needs in the Missoula district, the firm of Naranche & Konda of Butte, crushed, screened and stockpiled 157,500 tons of material during the 1956 season. The aggregates were used by department maintenance forces for the routine repair and service restoration of U.S. Highway 10-A in that vicinity.

N-K's operations were noteworthy both from an engineering and a contracting standpoint. From the engineering standpoint, the state thus was assured of needed tonnage of crushed rock produced to its Type A specifications. Specifications had been written around the material to give Montana a uniformly high-quality finished product which, when mixed with asphalt, will permit high-type maintenance work.

The operation from the contractor's viewpoint exemplifies the speed and efficiency which is possible with modern rock crushing equipment, despite the fact that 12 setups were called for, often many miles apart. The work was done in a short 3-month period. Included in the set-up locations were sites at Hot Springs, Paradise, Arlee, Sal-

tese, Superior, East Missoula, Frenchtown, Hamilton, Florence, Drummond, Phillipsburg and Garrison. It was a "hit and run" operation, with speed of moving and steady high production highly important.

The Naranche & Konda organization has developed, in the past several years, an extensive proving ground on which to perfect efficiency in this work. For some years now, the Montana state highway department has awarded the production of its crushed rock to contractors rather than to attempt the work with its own forces and equipment. N-K has bid successfully on such work, and two years ago made a similar maintenance crushing round

• How raw pit run material reaches the trap. A Cat D8 with U-dozer working in the slot.





• One of many plant locations in the "kangaroo" operation of Naranche & Konda's 46-VE plant.

trip with the first Pioneer 46-VE Duplex rock plant the company had purchased.

Early in 1956, in anticipation of this and other work, N-K purchased from Westmont Tractor and Equipment Co., of Missoula, a new Pioneer 46-VE Duplex crushing and screening plant, complete with a Caterpillar D13000 diesel driving unit, a D13000-driven generating set, a set of dual 4 x 12 vibrating screens, a 10 x 36 jaw crusher, and a set of 40 x 22 rolls. Other features of the plant included motorized head pulleys for ease in transporting the finished product and a widened wheel base for wider distribution of the load. The plant quickly handled four important jobs: a five-mile subbase crushing assignment at Wisdom, Montana; a 15,000 cu. yd. gravel job for the city of Kalispell; and a 13-mile highway job at Olney. The maintenance crushing kept the unit busy for some time from the August 11 starting date.

Specifications for the Type A gravel—which are controlled to

close tolerances by highway department technicians—are as follows:

Size	Percent
Screen	Passing
5/8 in.	100
No. 4	35 to 70
No. 10	20 to 55
No. 200	2 to 10

At Paradise location, here pictured, the native pit required about 67 percent crushing to produce a 5/8-in. material meeting these tolerances close to mid-point. Despite the high crushing ratio, the plant averaged 1,250-ton output each 8 hours, working a 16-hour day. According to John McGee, general superintendent of the field operation, the new gravel plant hit higher tonnages than is usually expected of equipment in that corner of Montana in production of 2-in.-minus gravel.

What are the problems connected with an operation like this? According to McGee, the principal problems are the changing pit conditions and the necessity of moving

from site to site in the most efficient and rapid manner. So far as changing pit conditions are concerned, the 46-VE Duplex gravel plant proved "tailor-made" for adjustment to meet such changing conditions. If a large percentage of the pit ran to large boulders, these were routed through the jaw crusher set at relatively wide clearance, and the end product then passed through the large 40 x 22 rolls for final reduction to size. There have been extreme cases in the Gallatin River country of central Montana where Naranche and Konda have found the use of an auxiliary jaw crusher unit ahead of the plant advantageous. But jaw and roll crusher settings were changed almost instantaneously—often while the plant was running—if pit conditions changed.

The raw feed input also came into the plant on a bottom screen deck, so that all accessible material was routed over a conveyor to the surge bin without being put through the crusher units. Belt drive slippage, which used to be customary in the old days before flash rain storms, was eliminated here by the use of a direct close-coupled drive between the diesel engine and the plant. Electric motors, of course, were driven directly from the diesel engine generating set.

According to superintendent McGee, the plant is the "type of set-up which will make rock at high production regardless of weather." During the past two years, N-K's other 46-VE Duplex continued to work



• Gradation control work done in a field laboratory by state technicians.



• M. J. Naranche, one of the partners in the aggregates firm.



• John McGee, field superintendent for Naranche & Konda.

well into late December, despite frost, rain, snow and inclement weather.

During the winter of 1955-56, the dependability of the unit in bad weather was proved on a job in Yellowstone National Park where engineers desired to finish up as soon as possible.

Material produced at the Paradise location was stockpiled by trucks in the center of a large circular mixing area for later use. The material was mixed by small portable hot plants or was cut out in a circular windrow for mixing with a slow-cure asphalt by motor grader blades as necessary. The final product was used for patching, half-sole work and pavement restoration.

Superintendent McGee expects rapid moves within reasonable limits when an assignment is finished. On most moves he sends one of two dozers ahead by transport truck to the new location, where they dig out a site for the reciprocating feeder and its trap. The dozers also level the site for a crusher stand. Moves up to 20 miles in length have been made rapidly (Montana frowns on road speeds greater than 15 mph, so N-K stays within this limit, hauling the 46-VE Duplex Pioneer crushing equipment on its own rubber with the feeder trap and 21 cu. yd. surge bin carried on a low-bed trailer drawn by a Mack truck.

Because of the speed and dependability of its rock crushing, N-K is rapidly gaining a favorable reputation for itself in producing a uniformly excellent finished aggregate, despite the fact that many miles and widely changing pit conditions separate the many sites in which work is done.

The project was under the general supervision of Scott P. Hart, state highway engineer of Montana. Kenneth Lawrence, division construction engineer at Missoula, has general supervision of field engineering.

AASHO-ASCE Joint Committee

A committee that is growing in importance is the AASHO-ASCE Highway Division Joint Committee. It was formed some time ago to exchange views on problems mutual to the 35,000 members of the American Society of Civil Engineers and to the American Association of State Highway Officials member organizations. The latest appointment to this committee is Earle V. Miller, associate in the firm of Johannessen and Girand and Miller, consulting engineers of Phoenix, Ariz. Serving under co-chairmen Rex M. Whitton, chief engineer, Missouri highway department, and Harmer E. Davis, director of the Institute of Transportation and Traffic Engineering, University of California, Miller will work with a committee consisting also of the following:

For AASHO—C. R. McMillan, chief engineer, South Carolina state highway commission; J. W. Johnson, superintendent, State Department of Public Works, New York; W. A. Bugge, director, Washington state department of highways and G. T. McCoy, California state highway engineer.

For ASCE—J. P. Buckley, chief engineer, highway division, Automotive Safety Foundation; A. N. Carter, consulting engineer and former manager of highway division, Associated General Contractors of

America; and W. A. McWilliams, formerly chief engineer, Delaware state highway department.

The formal purpose of the joint committee is "to provide a formalized or regular means of conference and interchange of views by designated members of the AASHO and the highway division of ASCE; to provide a vehicle for mutual consideration, on the broadest possible base, of the problems of the advancement of the art and science of highway engineering, and for marshalling the resources of both organizations into solutions of such problems; to provide a ready and recognized channel for referral of questions and problems from one organization to the other; to provide an avenue by which information of mutual interest and value can be readily transmitted for dissemination to either organization."

State Legislatures Tackling Utility Relocation Costs

Bills that would shift the cost of utility relocation on federal-aid highways from the utility owners to the highway departments have been up before many state legislatures this spring. According to a survey and estimate by the National Highway Users Conference, the cost of this shift confirms Congressional testimony that it would add about \$1.5 billion to the cost of the Interstate system program alone.

Such bills have been introduced in 14 states, requiring reimbursement not only for the Interstate but for all federal-aid system work.

The federal-aid highway act of 1956 provides that whenever a state pays for utility relocation in accordance with state laws and regulations, federal funds may be used to reimburse the state in the same proportion as federal funds are expended on the project. Utility companies have united to get under the wire on this 90 percent and 50 percent money.

No Ad Signs To Be Allowed on Chicago's Expressways

After a much-publicized wrangle in city council, Chicago's Mayor Daley revoked 17 permits which had been issued for construction of billboards along expressways completed or under construction.

He also signed a new ordinance banning advertising signs within 400 ft. of expressways, toll roads, Lake Shore Drive and parks of 10 acres or more.



● Assembling elements of frame for holding slabs apart while jacks are removed—one of several developments of project near Pittsburgh.

AN EXPERIMENTAL 600-ft. section of prestressed concrete pavement has been built near Pittsburgh by Jones & Laughlin Steel Corp. The prestressing operation was carried out in February of this year. Extensive tests on the roadway will be conducted in the coming months.

The idea for the experimental roadway was suggested by Admiral Ben Moreel, chairman of the board of the steel firm, who as an officer in the U. S. Navy Civil Engineers Corps and, as textbook author, is an authority on reinforced concrete.

Essentially, the experiment consists of anchoring connecting wire strands at opposite ends of a 400-ft. section of roadway to be formed. The strands pass through flexible steel conduits which are embedded in the concrete.

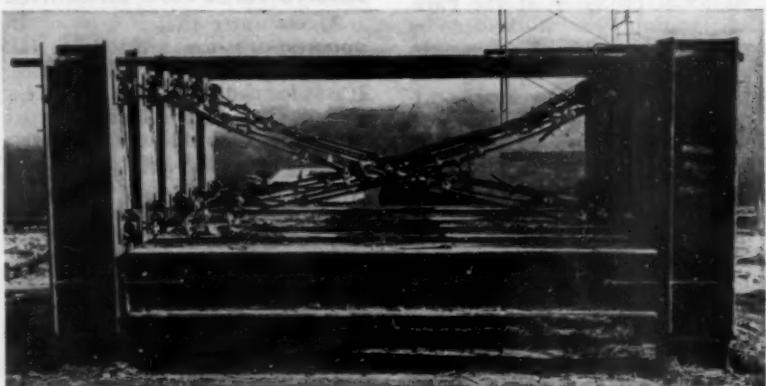
When the concrete for the prestressed section was poured, a 6-ft. gap was left to permit prestressing the strands with hydraulic jacks.

● Control panel for the 10 hydraulic jacks; compressor in foreground. Man with arm raised is Dr. Charles F. Peck of Carnegie Institute of Technology who directed the recording of the instrumentations and the testing of specimens.

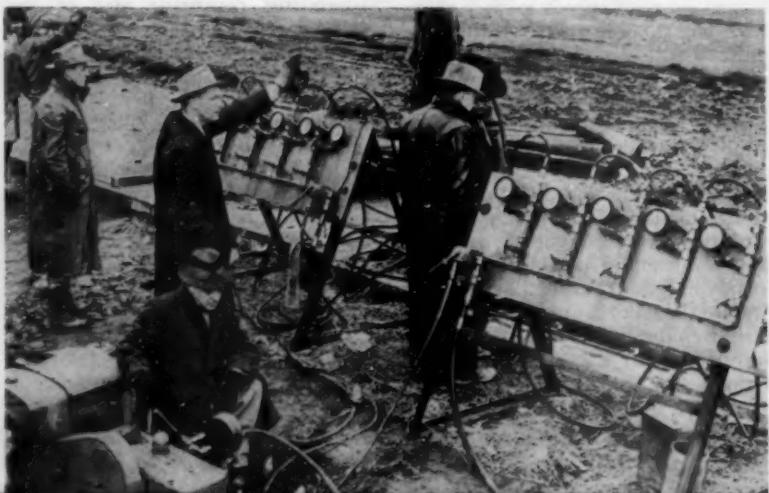
Experimental Prestressed

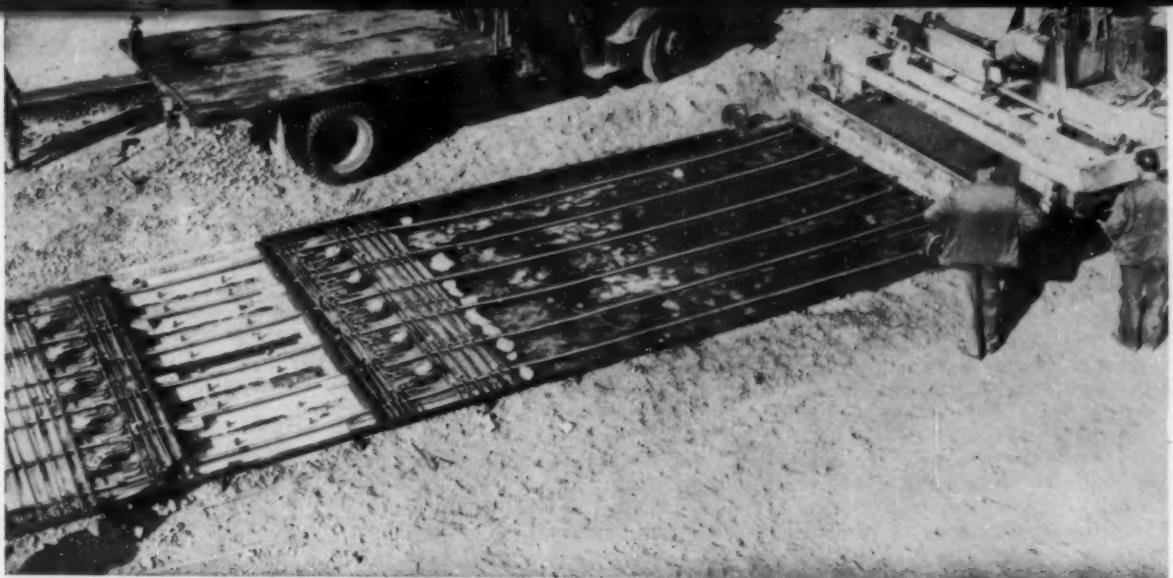
Pavement Built With Tensioned-Steel

Special joint design developed for project designed to test this form of prestressed concrete.



● Frame for holding the two prestressed slabs in place while the concrete cures in the gap. When the concrete in the gap is sufficiently cured, the frame is dismantled and removed.





• Center of the experimental section. All concrete poured except gap at left. Jacks were placed in gap and two end sections spread apart to supply the prestressing.

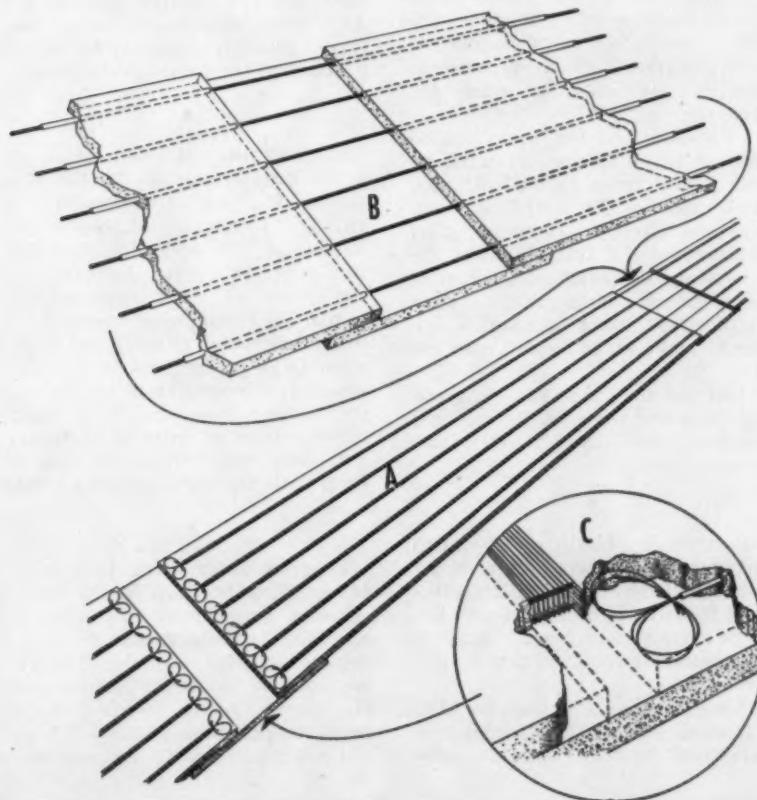
The concrete slab is 5 in. thick, comparable to an ordinary 10-in. pavement.

To find a suitable joint for 400 ft. intervals, the B. F. Goodrich Industrial Products Co. has been conducting research in collaboration with J&L. A prototype of a satisfactory joint has been made and is to be installed and tested. The joint, 12 in. wide, extends the full

depth of the concrete slab, is designed to allow the top surface to remain level during maximum expansion and contraction of the concrete. According to C. O. De Long, president of Goodrich Industrial Products, the joint is an entirely new concept. It includes a series of metal plates bonded to rubber to carry the vertical loads that traffic will impose on the joint.

In addition to the main 400-ft. section, a 100-ft. prestressed section has been placed at either end, bringing the total to 600 ft. Thus two joints will be made available for testing.

The project is under the direction of J. E. Morris, J&L's director-product development. John J. Murray is development engineer in charge. Engineering work on the project was done by Richardson, Gordon & Associates, Pittsburgh consulting engineering firm. Construction was done by Allegheny Contracting Industries, Inc. of Pittsburgh. According to J&L officials, ACI devised numerous new techniques for the project. Test specimens were studied at Carnegie Institute of Technology under the direction of Dr. Charles F. Peck. Instrumentation for testing of the prestressed section was designed by the Fritz Laboratory at Lehigh University, under the direction of Professor W. J. Eney.



(A) Wires anchored in the concrete at both slab ends. Strands pass freely in flexible conduit through entire slab, including gap in center.

(B) Enlarged view of gap. Jacks placed in gap widen it several feet. This tensions steel strands, prestressing the concrete in compression. Device holds slabs apart while jacks are removed, then gap is concreted.

(C) Detail of slab end, showing how strands emerge from conduit and are embedded in concrete. Special rubber joint designed for this location in concrete.

Boring Through Frozen Ground

Army engineers at Fort Belvoir, Va., are investigating the possibilities of excavating frozen ground in the Arctic.

Construction equipment specialists at the Engineer research and development laboratories have bored holes into a 4x4x7-ft block of frozen silt and sandy loam with a new truck-mounted earth auger developed by the H. B. Williams Manufacturing Co. of Dallas, Texas. The block had been frozen in Fort Belvoir's climatic test laboratory where for four days the temperatures hit 55 degrees below zero.

Holes of 18, 24 and 30-in. diameter were drilled four feet deep during the tests. High grade alloy cutting teeth, hard-faced with tungsten carbide, were used on the auger.

Difficulties in discharging the spoil were encountered by the auger, which operates on the centrifugal force principle. Studies are under way to develop a more suitable means of dispersing this material. High-speed jets of compressed air are currently being considered. The auger, one of two big units under test at the Engineer research and development laboratories, can dig a 6-ft. diameter hole 20 ft. deep at a rate of a half-foot per minute in ordinary, unfrozen earth. Its "big brother," a trailer-mounted machine also developed by the Williams company, is capable of digging a hole nine feet in diameter to depths of 70 ft.

Toll Road Work in Illinois

April awards following a succession of lettings throughout the past fall and winter bring to \$155,000,000 the commitments for roadway and supply for the construction of the Illinois state toll road project. Construction is in progress or being started on 32 of the 49 roadway sections.

Of the sum committed, \$36,000,000 is for materials including structural steel, precast concrete, guard rail, right-of-way fencing, etc., the remainder being for construction. Present contracts cover 131 miles of the 187-mile project, with additional mileages advertised.

• A debt-free state highway system is the boast of Kansas citizens. The state owns its 9,578-mile state highway system without any bond obligation after having made the last payment on a 28-year-old benefit district debt.

Editorial

Directional Sign Problem

The problem of the motorist in finding his way to the nearest entry point on a limited access expressway—such as will be constructed on the Interstate system in nearly every state—is a problem that is gaining increasing attention.

The problem was spotlighted recently by an article in the Chicago Tribune telling of the difficulty motorists are having in the locality around Gary, Ind., in finding their way to the interchange to get on the Indiana toll road.

The Tribune writer, Clay Gowan, conducted a survey and published a map showing the areas in the city of Gary where the largest number of complaints were found. Strangers repeatedly were trying to find places to park so that they could go into stores or "just anywhere" to ask how to get onto the toll highway threading through Gary.

The difficulty is reported to be particularly serious at night. The whole matter probably stems from the fact that the agency which built the toll road has not succeeded as yet in working out a full cooperative relationship on such matters with the state highway department and city officials. To quote the Tribune:

"Explanations for the tortuous lead-in roads to the interchanges were asked from Farwell Rhodes, spokesman for the Toll Road commission; Carl Vogelgesang, chief engineer of the state highway department; and Michael D. Puskar, Gary street commissioner. They indulged in 'buck passing' which would make an old army man envious."

Just one more aspect of our growing pains and the need for regional planning and inter-departmental cooperation.

Lump-sum bidding is much talked of these days and is being practiced here and there. Its advocates feel that it holds the possibility of greatly reducing the amount of engineering required to complete a road job.

A statement in this issue by Max Harrison, one of the construction industry's leaders, should carry

more than ordinary weight. We suspect that the highway department engineers will achieve results from lump-sum bidding somewhat in ratio to their ability to turn their hats around and cooperate enthusiastically on giving the method a fair trial.

If an engineering body wants to resist such an idea it can make it tough for the contractor, and in no time at all wind up with the verdict that the method won't work out.

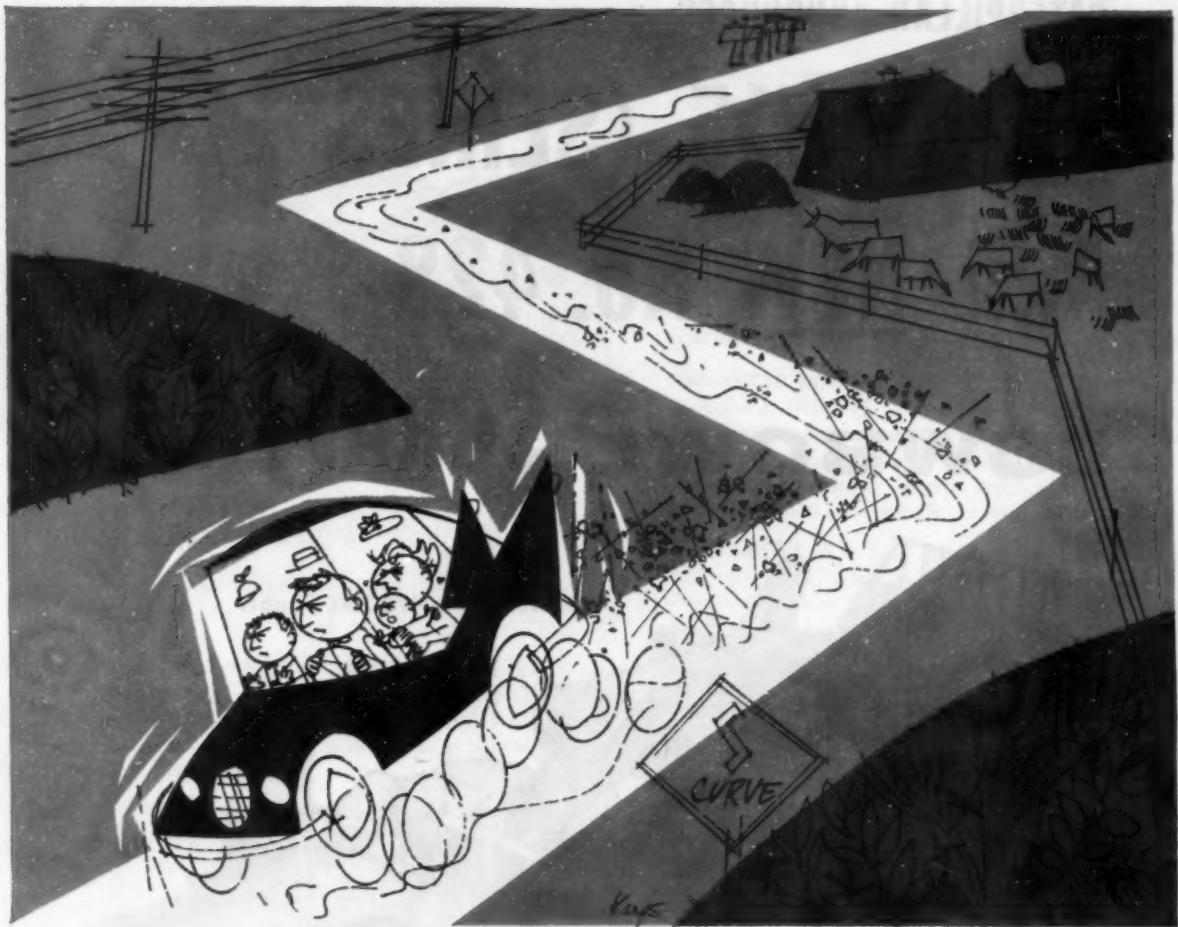
Anything that will save engineering manpower these days is worth putting to the full test.

Some old-timers will remember the period of 30 or more years back when local highway projects were financed by forming benefit districts around them. In Kansas, where the state highway system is now debt-free, the last payment has just been made on a 28-year-old benefit district debt, wiping out the last traces of this form of financing.

Benefit district road financing was a big thing in its time but was superseded by the state gasoline tax and other broader financing concepts. Possibly some day we might go back to the local benefit idea?

A good piece of public relations is the booklet put out by the Wyoming Highway Department entitled, "Interstate Highways in Wyoming." Written for distribution around the state, the book tells the reader what the interstate system is all about, what routes have been designated as interstate highways in Wyoming, what a grade separation looks like in its various forms, and how and why small communities on arterial highways are likely to be by-passed to conform with the latest designed ideas.

Progress note: Over 1500 engineers and technicians in the Pennsylvania department of highways have received salary increases ranging up to \$1,080 annually. Also announced by Governor Leader and Highway Secretary Joseph J. Lawyer is the provision of Civil Service status for 1,342 highway positions.



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Stabilizing the base course of primary roads with Morton Salt helps prevent the 9 out of 10 road failures which result from faulty foundations.

Stabilizing shoulders with Morton Salt not only checks erosion and rutting, it reduces dust and eliminates accidents caused by soft shoulders. By stabilizing with Morton Salt, you also save on grass and weed removal.

... for more details circle 312, page 16

ROADS AND STREETS, June, 1957

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CATERPILLAR ANNOUNCES

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AND NEW No. 428

LOWBOWL SCRAPER

The No. 428 LOWBOWL Scraper



The DW15 (Series E) Tractor

Here's a new Cat team loaded with features that add up to one thing—**A HIGHER PRODUCTION RETURN ON YOUR INVESTMENT.** See your Caterpillar Dealer for details on this great team's performance.

GET THE STORY IN BRIEF ON THE OPPOSITE PAGE ▶

A GREAT TEAM: The performance of the DW15 (Series E) Tractor and No. 428 Scraper can be summed up simply: bigger loads—faster.



FACTS ABOUT THE DW15 (SERIES E) TRACTOR

Around the world, the DW15 has proved that it can move material faster and more profitably than competitive machines in its class. Now there's a new DW15 (Series E) to give you even higher production. This is the story:

ENGINE: A new Caterpillar D326 Engine, designed especially for the DW15 (Series E), develops 200 HP (maximum output capacity).

And Caterpillar research has produced a 23% torque rise in this new engine! This means that high tractor rimpull is maintained through a wide range of travel speeds in each gear, and the need for gear changing is decreased. In fourth gear, for example, over 3,000 pounds of rimpull are delivered at travel speeds from 9 MPH all the way to 18 MPH. A new engine, yes—but with these traditional Caterpillar advantages: uses inexpensive No. 2 furnace oil without fouling; needs no fuel system adjustments; requires no cleaning of fuel injection valves.

TRAVEL SPEED: The DW15 (Series E) offers ten speed selections, from 2.7 to 37.2 MPH. But, more important, it provides four-wheeled sure-footedness—the ability to use the speed on the job. Operators ride with more comfort, feel greater stability. They travel faster, and in safety.

MANEUVERABILITY: Four-wheeled stability means faster cycle time because the DW15 (Series E) can make short radius turns at higher speeds. It can turn without stopping inside a 35-foot diameter and in a smaller area through use of a turn-back-turn maneuver.

VERSATILITY: The DW15 (Series E) provides versatility that far surpasses similar sized two-wheeled machines. It can be unhitched from its scraper and

... for more details circle 256, page 16

used as an independent unit to tow compactors, water wagons or other units, and it can be teamed with the Athey PR15 Wagon for rock hauling work.

FACTS ABOUT THE No. 428 LOWBOWL SCRAPER

CAPACITY: Struck—13 cu. yd.; heaped—18 cu. yd.

ADVANCED DESIGN: There is more to Caterpillar's exclusive LOWBOWL design than a low bowl profile. Width and length proportions are designed to give maximum loading efficiency. And every component—particularly the apron, ejector, cutting edge—is likewise designed to do its part in achieving capacity loads.

LOADABILITY: The final result of this careful engineering is this: bigger loads—faster. LOWBOWL design gives the new Caterpillar No. 428 Scraper a faster loading rate because incoming material meets less material resistance and less friction from the load already in the bowl. While other scrapers are still in the cut struggling for the last few yards of their load, the new Cat units are on their way to the fill—with big pay loads!

NEW FEATURES: Outstanding new features of the No. 428 include: increased ground clearance—for high-speed travel in rough going; increased apron lift—for faster ejection of any material; large area pushblock—for better pusher contact.

NEW TIRES FOR THE DW15-No. 428

Both the CAT* DW15 (Series E) Tractor and No. 428 Scraper feature 26.5-25 wide-section tubeless tires—the product of extensive co-operative research by Caterpillar Tractor Co. and leading tire manufacturers. Tubeless tires offer load-carrying capacity comparable to conventional tires at a reduced inflation pressure. This gives better flotation and traction while decreasing rolling resistance. The wider tire treads take a "grouser like" bite, making more efficient use of engine horsepower. And tubeless tires eliminate 80% of the down time caused by tire failure.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

A Contractor Presents Case for

Lump-Sum Bidding

By M. C. Harrison

President, Harrison Construction Company, Pittsburgh, Pennsylvania

The federal highway program, now starting, presents a challenge to the road building division of the construction industry that must not be underestimated. A study of the increase in dollar volume scheduled in the various states in the next three years is staggering. For contractors to blandly state that we are prepared to handle this volume under the present method of payment and calculating in use by most of the states would be tantamount to admitting that we cannot count. There are several hurdles in our path toward successful completion of the program, the most important being skilled manpower and financing. Equipment can be ignored since it is available and is readily financed, but financing to cover accounts receivable and for working capital is another matter altogether.

In reviewing the first of our problems, we should analyze the work of the skilled manpower on an average road construction project and, for the sake of brevity, consider only the civil engineer, since this man is most discussed but not by any means all-important. Superintendents, foremen, operators, carpenters, office man and even laborers are very important, but in varying degrees.

• *First To Last With the Engineer.* The engineer first assists in the preparation of estimates by analyzing specifications and plans, making mass diagrams of the excavation to determine the average haul, computing percentages of rock and earth material in unclassified bids, checking plan quantities against bid amounts on all items and breaking down items to their biddable com-

ponents. Considering the bid a successful one, he, in most states, performs the layout work, works with the resident engineer to compute periodic current estimates, records and measures all extra work and then at the completion of the job measures and computes quantities on an as-built basis, checking with the resident engineer on his calculations. In most states a check is made on the resident engineer by having all notes and calculations refigured in the district or central office of the highway department, requiring our engineer once more to spend time in compromising or correcting calculations on all items involved in the job.

• *Finances Tie-in.* In the last operation mentioned above lies the difficulty with our second problem, finances. The resident engineer, anticipating the central office check, deliberately holds back quantities from his so-called semi-final calculations and this amount, added to the two to five percent retained after the final acceptance, waits upon the services of a group which is now swamped with work at a time when there is only a fair program. From personal experience, this period has been as long as 18 months on one project.

• *Results.* With high interest rates in a tight money market, it behooves us to study this matter to see if we can find some workable solution. The part that strikes us most forcibly in the analysis is the recheck made in the central office of the highway department. This wastes our engineers time and absolutely keeps our working capital in a deep freeze. Bankers cannot

understand this, and rightfully so, because what other business is so hamstrung?

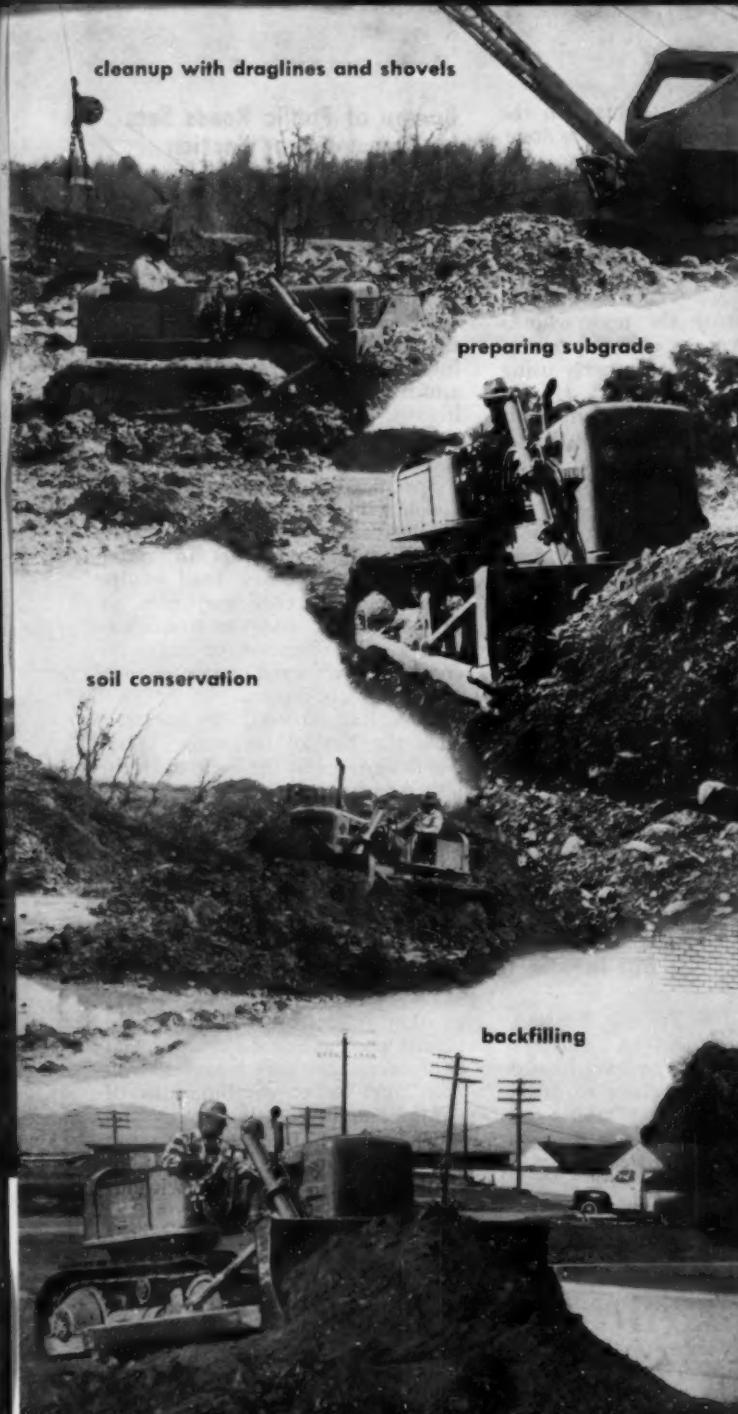
• *The Solution.* If we could transfer a part of the man hours involved in the checking of as-built quantities to the bidding analysis, we could conceivably reduce the items to a single unit. This would mean making a complete check of the job and the plans and make it possible to tender our price for the work on a *lump sum basis*, requiring no further check on calculations except to see that the job actually conforms to the plans. This, at one stroke, would eliminate or reduce tremendously the central office check and make our working capital immediately available to do more work for us and for the program.

• *How It Would Operate.* Some road jobs can be classified as "cut and dried" upon presentation of the original plans, and our suggested procedure could be applied en toto. There are projects which contain items that will vary, and these could be dealt with individually. To name a few items: excavation for benches for fills, removal of possible slides, extra depth for drainage structures, additional backfill, removal of unstable or unsuitable material, extra depth for footer concrete, lengths and number of bearing piles and a few classed as miscellaneous.

Not all projects have all these items, so they could be reduced to a minimum and listed in the bid with an estimated quantity, the sum total of which would affect the bid total. Practically all contracts have and should retain the clause allowing the owner's representative the power to either negotiate prices for unforeseen contingencies or order the work done on a cost-plus basis.

This suggested method would have the added advantage of forcing a contractor to become completely acquainted with a project before he bids it, a leveling process that should produce both uniform and intelligent bids. The combination of a competent contractor and a resident engineer free to devote his time to job problems and inspection should produce the best quality road at the cheapest possible price.

Some extra time in the proposal stage and a breaking of our habits of easy and careless bidding over the years should do it. This would be at least one response to the challenge that the road program presents.



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Tractor-Dozer

**Handles all these construction jobs faster,
easier than anything near its size!**

**You can see it... but there's only
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... for more details circle 238, page 16
ROADS AND STREETS, June, 1957

Job Safety

Management's Responsibility For Safety of Its Workers

(An editorial in Henderickson News, employee publication of Henderickson Bros., General Contractors, Valley Stream L.I., N.Y.)

Management bears full responsibility for the safety of workers in the construction business. The heads of a company do their part by establishing and implementing the policy that safety is the first consideration in all phases of the business. Henderickson Bros. represent one of the finest examples of this in that they go "all-out" in the promotion of safety both inside and outside the organization. Theirs is not a passive interest; they do something about it.

The heads of a company do not constitute the whole of management. In the construction business the whole management team includes every man in the outfit who has anything to do with supervising the work of other men. Safety in operations is as effective only as the interest shown and the activity of these men.

• *Mr. Alan A. Porter*, vice president of the U. S. Steel Corp., writes an article in which he lists all the men in a construction business from the top down. He points out that if one man in the management line of responsibility fails in understanding, or if he refuses to be bothered with accident prevention, the whole thing will fail for all of the men under him. He says that the basic principle is governed by the rule of taking time to have everything safe, then go ahead. At this point he also says that the foreman becomes the most important man in the whole picture of accident prevention. He holds his job because he is supposed to know more than his men about the best way to get the work done. His compensation is greater than that of his men. He has to get results to earn his money. That means he must get production and he must get it with safe operations or he has failed to do the profitable job that he was hired to do.

That the foreman can do a better job of accident prevention than any other man in the outfit should be

axiomatic. He is the man on the firing line where the work is done. He is close enough to the men to know when they are performing an operation without taking precautions to prevent hazards that may injure themselves or their fellow workmen.

• *He can stop* the man who is taking unnecessary chances, correct the man who is not properly using the safety devices provided. He can make sure that the equipment in his charge is in good order and that it is being properly used so that equipment failure will not occur to cause injury to men or property on his part of the job. In short, he can stop the foolish things that men do before someone is injured.

The foreman, by a word here and an example there, can do much to educate his men in safe ways of working. Where one finds a safety-minded and safety-acting foreman, the chances are great that an excellent accident record will be found, a by-product of the education that the foreman has passed on to his men.

Bureau of Public Roads Sets Up Development Section

A DIVISION OF DEVELOPMENT has been established in the Bureau of Public Roads, according to an announcement by B. D. Tallamy, Federal Highway Administrator.

The division will initiate and execute the development work of the bureau. It will encourage the integration of the results of research and industry development into the highway programs of the bureau, the states and other federal agencies including the foreign aid programs.

Specifically, the work of the division will include the application of electronics and electronic computers, new techniques in aerial photogrammetry, new road equipment developments and uses to highway work, and the simplification and clarification of highway, construction, and maintenance plans and operations.

H. A. Radzikowski, who has been with the bureau for many years, was designated by the Federal Highway Administrator to head the division.

Results Specifications for Embankments "Sound Good" But Involve Control Problems

Comment by J. F. Tribble, Assistant Construction Engineer, Alabama State Highway Department, supplied by letter in answer to query from the Editors. Mr. Tribble is a nationally recognized construction authority and committee leader.

There has been a lot of convention talk lately about results-specifications. It all sounds good but, in getting down to cases, proves rather abstract. We are as sympathetic toward the plan as any state, but nobody has yet set forth a procedure we believe would be workable. Everyone knows how nice it is to accept a road or bridge which appears at the time to represent excellent results but nobody even mentions a basis for rejecting unsatisfactory work with the contractor making you prove your case every inch of the way. We think, therefore, that step by step inspection of work and even equipment and methods is going to be with us for quite a while longer.

On embankment work and soil-bound base courses, we have about the same specifications for equipment, spreading, rolling and density

as most other states, but we add clauses such as "or other approved equipment that may become available," or "other combinations of equipment that will provide required results." In this way a minimum requirement is established for some of our small projects without handicapping contractors on the big jobs who may wish to use bigger equipment.

We hold to layer construction and test random embankment layers for moisture and in-place density by the funnel-poured sand method. We have an 8-in. layer limitation loosely enforced, but find the contractors rarely spread that thick.

As long as uniform density is being secured we usually let a contractor try any type of compaction equipment, new or old.

The same policy has been in effect, without variation, for over 16 years and results have been good.

We do not provide for separate payment for rolling. Our earthwork unit prices are fairly stable. They vary, of course, as the jobs are more or less favorable but not noticeably due to type of inspection and control requirements.

ALLIS-CHALMERS

HD-6

Tractor-Dozer



**MORE POWER—BETTER DOZING SPEEDS—
BIG-DOZER DESIGN—NEW HANDLING EASE!**



Only dozer of its size with these basic advantages . . . engine-mounted rams, long push beams, fewer linkage points (only 2 instead of 5 or 6). These big-dozer features all combine to provide more accurate, gouge-free dozing . . . longer equipment life.

Convenient rotary-valve blade control makes the HD-6 the easiest handling dozer of its size. With more than 5½ feet of track on the ground, it has outstanding flotation . . . yet turns easily in any terrain. The HD-6 also combines large, low-set front idlers with a blade snugged close to the radiator guard . . . to provide balance that means better dozing, more work done under any conditions!

You can see it . . . but
there's only one way to
prove it—on **your** job!

... for more details circle 238, page 16



1 Can this crane do it? Quite a reach.

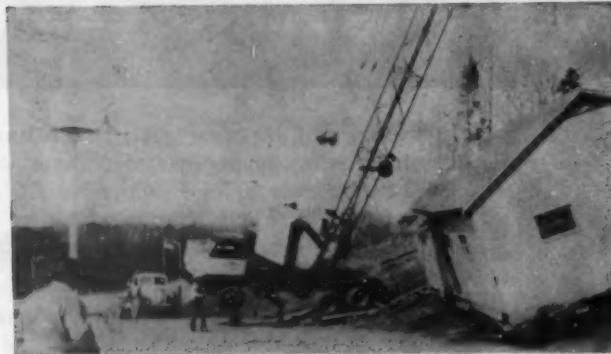
Crane Operator Shows Skill With Big Load

The accompanying step-by-step pictures show a rather remarkable job of crane handling. Supplied by Douglas C. Cochran, president of the excavating contracting firm bearing his name of Overlook Road, Poughkeepsie, New York, these pictures show a Lorain M425 truck crane in action.

The 14-ton building is a field office for Turner-Campbell, who were contractors for erecting a new structure for International Business Machines Research Laboratory at



2 Off the ground, and starting to swing and lower.



3 Blocking under outrigger gave way in soft ground, but the alert operator got the house down.

Poughkeepsie. Near the last of the crane operation, the blocking under the outriggers gave way due to soft ground. Despite this mishap, the building was safely lowered onto the Cochran company's trailer, using only one outrigger. The project was completed without harming the structure in any way.

4 Crane has been reblocked, and house is hung over roadway as trailers are backed under it.



Bucket teeth and ripper available at extra cost.



TEETH AT BOTH ENDS* BOOST PROFIT!

Production really steps up when this working team moves in—the Allis-Chalmers HD-6G tractor shovel with replaceable bucket teeth and rear-mounted ripper. Here's a job-proved combination engineered by the company that pioneered modern tractor shovels for the construction industry.

When the hydraulically controlled ripper bites in, even hard blacktop has to give. With the help of teeth at the front end, too, tough material is loosened and broken up for fast, easy loading—a full bucket every time.

You get more work done in less time because the heavy-duty HD-6G is designed for tough jobs. With 72 net engine hp and six-truck-wheel stability, it offers performance that means efficient production, bigger profits for every hour on the job.

These important advantages are also available on bigger Allis-Chalmers tractor shovels—the 2½-yd HD-11G, the 3-yd HD-16G, and the 4-yd HD-21G ... to help you meet the needs of your tractor shovel jobs profitably. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

... for more details circle 238, page 16

ROADS AND STREETS, June, 1957

Diamond Drill Cuts 250 Holes Through Floor

Circular openings each six inches in diameter were precision-cut through 4-inch concrete floor in 64 hours' job time.

WHEN the big U. S. Government Quonset hut in Toulon, Ill., began failing at the seams from weight of stored grain, heavier bolts and straps had to be installed at the floor level in order to keep the sides from spreading.

The original straps and bolts were too light for the side-thrust load and as a result they were pulled loose at floor level. To get new anchorage, holes would have to be drilled through the reinforced concrete floor. The job called for the drilling of 250 six-inch diameter holes 4 in. through the gravel-aggregate concrete, so that the new anchors could be attached to the floor.

Anchor rods $\frac{1}{2}$ in. thick had to be installed, and concrete poured into the space around the anchor bolts in order to secure them.

Ed Blank, partner of a local repair

shop, attempted the job with carbide drilling equipment. Although it was costly, Blank had a specially constructed rack built on the rear of a farm tractor to operate the carbide drill. Blank found, to his dismay, that after drilling only eight of the 250 holes, he had worn out or broken down two carbide drills. Realizing that this method of drilling could not handle the job, he began to look for another drilling method.

Break-Out Area

He rejected pneumatic or electric hammers as they were out of the question for this large size hole. There would be a break-out area which would require considerable patching.

After going to the trouble and cost of constructing a special rack and us-

ing carbide drills, Blank wanted a drill which first of all would do the job. He also wanted equipment which would be economical and efficient. He had lost considerable time already.

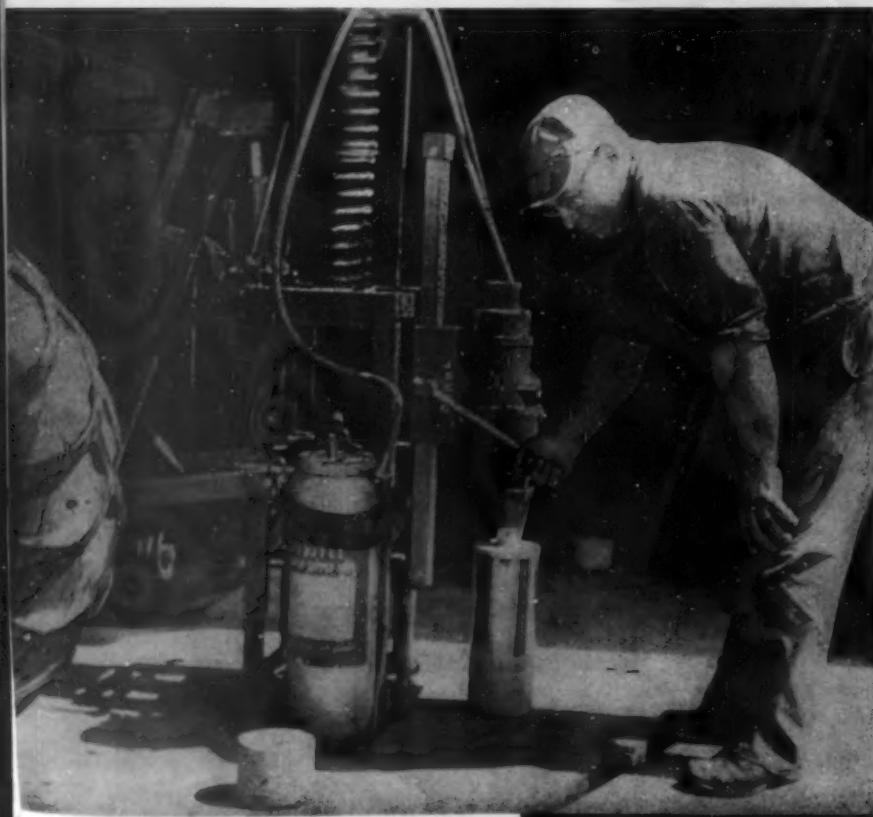
The job solution proved to be diamond drilling, for which a Truco portable diamond drilling machine was used. A heavy motor was selected, and diamond drilling bits of the same manufacture were employed.

Because of the adaptability of the Truco unit, it was easily attached to the rack previously constructed for the other drilling equipment. (Ordinarily, this unit is mounted on rubber-tired wheels. The large spring which applied pressure to the carbide drill was unnecessary for this drill; the unit's ratchet gave the necessary manual pressure. Also, very little of the steel framework was needed.

The machine took 3 to 4 minutes drilling time per hole. Set-up time was from 4 to 5 minutes per hole. Thus, a hole took only 8 minutes, allowing occasional time required to knock out the cores. Total drilling time was 32 hours, total job time, 64 hours.

Bits averaged 83 holes before resetting. At this point, two of the three bits were still giving fair cutting action but were retired to assure maximum salvage of diamonds for resetting. (Under these conditions, salvage is high because diamonds thus considerably treated usually can be reset with one remaining sharp cutting face exposed, for efficient re-use).

- Diamond drill being used in conjunction with frame originally made to support another type of drill equipment. Note a 6-in. "core" on floor in foreground.



California's largest budget

The largest budget yet for the California Division of Highways has been announced. It consists of \$464 million for the 1957-58 fiscal year, an increase of more than \$100 million over the previous year.

The budget provides \$354 million for construction, rights-of-way and contingencies; \$25 million for maintenance; \$25 million for preliminary engineering, \$2 million for a statewide highway planning survey, \$7.5 million for administration; \$4.5 million for buildings and plant; and \$1.75 million for honor camp projects.

Construction items include \$220 million for major projects, \$127 million for right-of-way and \$6 million for contingencies. There will be \$30 million for non-state city streets, \$12 million for county work and nearly \$1 million for city engineering aid. Of the over-all sum, \$142 million will be federal aid according to state highway engineer George T. McCoy who announced this program.

You can see it, but there's
only one way to prove
what the **HD-6** can do for you!



**Call your nearby
Allis-Chalmers construction machinery dealer
—he'll demonstrate one on your job NOW!**

... or send us this

**Allis-Chalmers
Construction Machinery Division**

Milwaukee 1, Wisconsin

Gentlemen:

Please have the Allis-Chalmers construction machinery dealer serving my area arrange a demonstration of the HD-6 tractor-dozer for me.

Name _____

Address _____

City _____ State _____

Type of Work _____



WEIGHT OF TYPICAL BATCH:

Portland cement . . . 631 lbs.
 Natural cement . . . 143 lbs.
 Sand 1222 lbs.
 1-inch stone 1446 lbs.
 2½-inch stone . . . 1787 lbs.

145 BATCHES AN HOUR speed

Paving contractor on a large air base in one of the central U. S. states needed a fast, dependable batch plant that would turn out approximately 130 batches an hour. To meet production requirements, a fully-automatic Johnson one-stop plant was installed on a rail siding, a short haul from the immediate paving area.

Supplied by rail, truck

Bulk cement, delivered by rail car, was stored at the plant in three Johnson 825-barrel silos. Sand and stone, delivered by truck and rail, were fed into three Johnson auxiliary storage bins by a traveling stacker. From there, aggregates were fed to the batch plant by inclined conveyor.

Kept two 34-E pavers busy

With this efficient material handling system, the 5-compartment bin on top of the batch plant was stocked continually. The plant accurately weighed out aggregates and cement ahead of heaviest schedules — kept two 34-E pavers busy full time pouring 12-inch slab. While the plant's top-speed potential of

180 batches an hour could not be fully utilized due to normal job delays, this *reserve production capacity* easily assured an average of 130 batches an hour. In fact, during one 11½-hour period of peak operation, it weighed out a total of 1669 batches. That's an average of better than 145 batches an hour.

Actual pour for the 11½-hour day was 2300 cubic yards of concrete — or 200 cubic yards an hour. Each

batch weighed 1.38 cubic yards, and consisted of five materials — sand, two sizes of aggregates, and two types of cement.

20 second batch-time

On this one-stop operation, average batcher fill-time was 10 seconds — discharge time, 10 seconds. Automatic control maintained high output, and assured pin-point weighing accuracy of every batch. A separate fully-automatic batcher was used for each of the aggregates and cement — all weighing up at the same time. These single-material Johnson batchers operate on electro-pneumatic control. Fill valves and discharge gates are automatic air-ram operated.

Johnson batch plants also can be arranged for two- or three-stop charging. Investigate the possibilities of increasing concrete production on your highway and airport paving. Get the complete story on Johnson automatic batch plants with multiple arrangements of single-material batchers, and one-man push-button control. All sizes, all types. See your Johnson distributor, or write us for latest batch plant catalog.

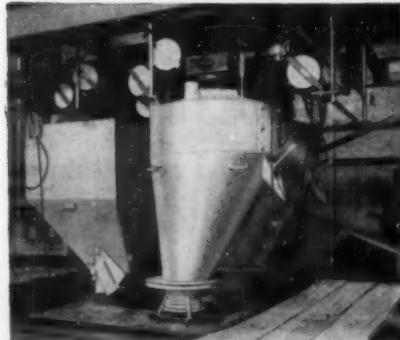


JOHNSON automatic BATCH PLANTS





paving job



Multiple batch selections

In Johnson single-material plants for roadbuilders' use, dial scale with electric cut-off switch is usually used. When more than one type of batch is required, Johnson single-material batchers can be equipped with mix selector and recorder for 12 different batches — all controlled from central operator's position. (Each aggregate batcher can be equipped with moisture compensator which automatically gives dry weight.) Up to 120 batch selections are available on Johnson automatic concrete plants for dams and commercial ready-mix installations.

C. S. JOHNSON COMPANY
CHAMPAIGN, ILL. (Koehring Subsidiary)

... for more details circle 300, page 16
ROADS AND STREETS, June, 1957

Truck-loading with 16-S concrete mixer

Producing concrete for curbs and gutters, Kwik-Mix 16-S loads batch into trucks from ground-level. Tower loader gives 9 ft.-2 in. discharge height. Bucket holds full batch, is powered by mixer engine, dumps automatically at top of tower. Also available on 11-S Dandie®, and Kwik-Mix bituminous mixers for stockpiling and loading into trucks, overhead hoppers and forms. Ask Kwik-Mix distributor for more information, or write us.

KWIK-MIX® Port Washington, Wis.
(Koehring Subsidiary)



Puts trenching on fast "work-and-run" basis

Next job is only minutes away with this rubber-tired Trenchmobile®. It runs from job-to-job over city streets, highways or cross-country at 12.6 m.p.h. Works fast, too. Digs up to 14½ feet per minute, 8 to 16 inches wide, 5 feet deep. Sloping ladder boom undercuts walks, curbs, gutters, makes vertical set-ins. Hydraulic-control backfill blade optional. Also check big Parsons line of crawler-mounted wheel-type and ladder-type Trenchliners®.

PARSONS • Newton, Iowa
(Koehring Subsidiary)



No room to turn here— and no need to turn

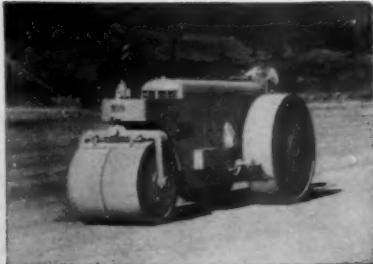
Shuttling back and forth on overhead trestles, in tunnels, on narrow haul roads, Koehring 6-yard Dumper® travels round trip without turning. It has the same speeds forward and reverse — operates with equal ease in either direction. Every turn eliminated saves 15 seconds, cuts cycle-time. You'll also like its one-second gravity-dump (no body-hoist), 24% gradeability, and other heavy-duty advantages for off-road haul.

KOEHRING Company
Milwaukee 16, Wisconsin
V-6





THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR



3-WHEEL ROLLERS

heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.

How to select compaction equipment

The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

FINE GRADE FINISHING—Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING—Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for



TWO AXLE TANDEM

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light fin-



3-5 TON PORTABLE TANDEM

ishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.



BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

... for more details circle 253, page 16

ROADS AND STREETS, June, 1957

Cedarapids helps Florida Turnpike Authority achieve

**THE LOWEST COST PER MILE
OF ANY MAJOR TURNPIKE IN THE COUNTRY!**

By producing 2,000 tons of low-cost specification bituminous concrete per day, this big Cedarapids G60 plant did more than its share in helping Florida complete its Sunshine State Parkway at the lowest cost per mile yet! The all-automatic G60 kept well ahead of the whirlwind paving program in spite of a difficult aggregate problem.

This plant is one of two G60's owned by Rea Construction Company of Charlotte, N. C., which is well set to beat competition on any job demanding big-quantity production of highest quality bituminous concrete.

It takes G60 design and efficient operation to handle big turnpike or airport paving contracts

at the most profitable levels. All-automatic operation clips seconds off cycle time and controls the mix to meet strictest specifications . . . there are no profit-eating delays for changeover from mixing binder course to producing wearing course, or providing various mixes for the drive-in trade . . . and typical Cedarapids-Quality construction cuts maintenance costs to the absolute minimum.

And remember . . . if you need less production for smaller jobs, you'll get the same high profit margin with a Cedarapids G40 or H15 plant. Ask your Cedarapids distributor for information about the complete Cedarapids bituminous mixing line before you bid on your next job.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Cedarapids

Built by
IOWA



... for more details circle 296, page 16

ROADS AND STREETS, June, 1957



• (Left): A ticklish moment in transporting the 156-ft. girder through Detroit streets. (Right): Other girders which have arrived at the expressway project and await unloading. (Photos—Detroit Free Press, Detroit Daily News)

Long Girders Snaked Through Detroit Streets

AN EXAMPLE of skillful cartage work and good inter-government cooperation occurred recently. It involved the hauling of very long and heavy steel girders through Detroit streets for expressway bridges.

The first and longest of the girders was a 150-ft., 90,000-lb. unit required for the Dequindre over-

pass on the Edsel Ford expressway. Fabricated by R. C. Mahon Co. as the longest girder this steel fabricator ever built, the girder was hauled by Hess Cartage Co. of Melvindale, Mich. Working under special permits, this girder was delivered without interruption just before Thanksgiving day last autumn. The hauling equipment in-

cluded a Mack truck-tractor with a special "fifth wheel bunk" that allowed the tractor to swivel under the load while maneuvering sharp street corners. The rear end of the load was carried on a two-axle dolly.

A second girder for this project was delivered with some difficulty due to a 35-mph wind. All moving plans ceased until the wind subsided, due to the extensive wind surface which such a large girder presents, with serious overturning danger.

Hess Cartage delivered girders also during this period for the Fort Street Union depot structure on the John C. Lodge expressway, for which the Wayne county road com-



• The girder shown in place here, part of the structure carrying the Union depot tracks over the John Lodge expressway, was a 130-ft. unit which also required special handling, as pictured on the next page.

• The 156-ton girder loaded and ready to move out from the Mahon Co. plant.



• Moving the 130-ft. girder for the Union depot expressway overpass.



mission is handling the engineering for the state highway department. Pictured here is a 130-ft. girder, fabricated by Paragon. This 35-ton load was handled with a Ford T-800 tractor, using a tandem semi trailer with bunk and a tandem axle pole trailer equipped with girder lashed to make the load actually part of the rig.

Delivery of girders for these two projects required a great deal of advance planning. The route had to be carefully selected and permits and other red tape taken care of with the county, city and state. According to the Hess officials, the company first outlined its moving plans, then cleared them for degree of oversize and weight with the city and county highway authorities. Wayne county road commissioners were notified. The Detroit city department of public works approved the plan after checking to see if the chosen streets were suitable. The city's park and recreation inspectors were on hand to supervise operation on moving day.

The police of Detroit, who also required formal notification, supplied qualified personnel to cooperate in handling the traffic and clearing the route. In more than one instance the load had to be Y-ed around and backed a distance

of two blocks to the final unloading site, requiring drivers of exceptional ability and experience.

Hauling had to be done during specified hours. In addition, there was a matter of liability in case of damage to property, including the cost of removing and replacing street signs and other utility installations that hindered passage.

Hess Cartage Co., serving the prime contractors in each instance, were selected because of their extensive facilities and specialized experience. This company operates more than 1,000 pieces of equipment at a 16-acre establishment.

LP-Gas-Powered Equipment Used in Turnpike Tunnel

Motor equipment employed recently in repair work on tunnels on the Pennsylvania Turnpike spotlighted a new "first" in the use of LP-gas power. Concrete mixer trucks thus powered were used and subjected to tests by state officials, who granted special authority to operate the trucks on repair work. The equipment was authorized after it had been fitted with OCM catalytic purifiers which removed carbon monoxide from engine exhausts on the trucks.

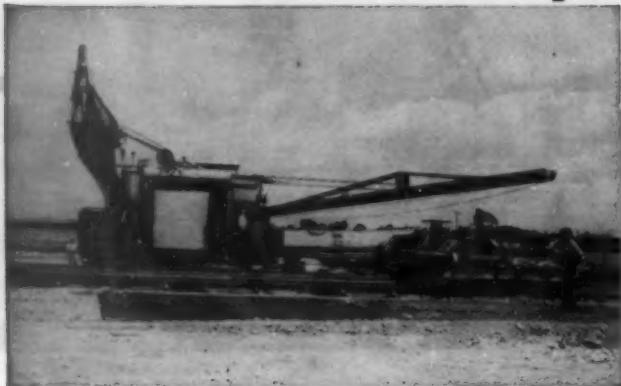
Film on Illinois Test Road

"Test Road, U.S.A." is the name of a new 18-minute color-sound film just completed covering the test road project near Ottawa, Ill., sponsored by AASHO.

The film covers the entire field of operations, reflecting the latest in road building equipment, methods and techniques in grading and sub-grade stabilization. Some of the equipment used on the project was especially designed for the job to achieve the precision and perfection standards specified by AASHO engineers, and will no doubt serve as a ready check-list for future operations.

The film, sponsored by Seaman-Andwall Corp., Milwaukee, Wisc., is documentary in nature, impartially covering the most significant advances and details of interest to anyone concerned with modern highway improvements. It is being scheduled for viewing by engineering groups, highway department officials, road commissioners, state and county boards, community organizations, as well as special meetings of distributors and manufacturers. Write Seaman-Andwall Corp., Milwaukee 1, Wisc., for information on acquiring the film for showing.

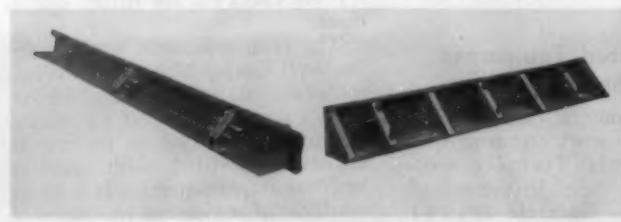
Here's the only Complete Concrete Paving Line with Experience



Blaw-Knox MultiFoote Paver gives you faster, more complete Mixing

The exclusive cone-shaped drums of the MultiFoot Pavers assure you of thorough mixing in a shorter time or more complete mixing in a specified time than you could get in an ordinary paver with the common cylindrical-shaped drum. The natural end-to-end motion of the aggregate, cement and water produced by the cone drum results in a folding action that completely turns the batches over and over to assure the most thorough mixing in the shortest possible time.

With this more thorough mixing and the faster skip operation of the MultiFoote, hydraulic controls and the automatic cycle you can be sure the MultiFoote Paver will give you more batches per hour. If you are planning concrete paving work be sure to see your Blaw-Knox MultiFoote distributor to get all the facts about these high capacity units.



Self-Aligning Road and Airport Forms

Setting Blaw-Knox Self-Aligning Paving Forms true to line and grade is a cinch. Look at all the features that save time and money. Double-wedge staking system prevents tipping of forms by crooked stakes. One-piece lock-joint end slides give you fast aligned joints. Buttress-type stake pockets together with over-all sturdy construction of the forms prevent mis-alignment. Road forms are available in heights of 6" or more and Airport forms in heights of 12" or more.

depend on the
BLAW-KNOX
"Complete Package"
for maximum profit



Dependable Blaw-Knox Finisher

Team-up a Blaw-Knox two-screed Finishing Machine with a Blaw-Knox Spreader and you can handle the output of two dual-drum pavers working at maximum capacity. With this team you will be sure of turning out highest quality finish from harsh, dry concrete. Easily adjusted widths and choice of traction and screed speeds adapt Finisher to fit any paving job.



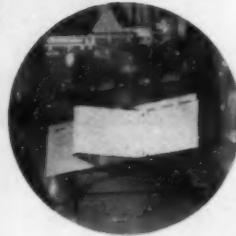
Blaw-Knox Precision Subgrader

Here's the only Subgrader that excavates by vibration — cutting through even the hardest subgrade to produce a perfect grade true to crown and cross-section. Fast and accurate, it produces more work with less power at a lower cost per square yard to assure accurate control of slab thickness to save concrete.

Fast Accurate Batching Plants

Blaw-Knox Aggregate and Cement Bins and Batching equipment are available to match the high capacity of all units in the Blaw-Knox Complete Package of Concrete Paving Equipment. Both Cement and Aggregate Batching Equipment are available with manual, push-button air-operated or automatic controls.





Only Blaw-Knox Concrete Spreaders spread with a Blade — the Natural Way!

Even the driest and harshest concrete is easily and naturally spread with the automatic transverse action of the spreading blade, shown in circle at left. This transverse motion of the spreading blade

spreads concrete uniformly to elevation required and clears the path for forward motion of the spreader. Since there is a minimum of action on the concrete, there's no segregating effect regard-

less of its dryness or size of aggregates. Automatic reversing of the spreader blade relieves lateral pressure so alignment of forms is never disturbed. Blade can be set to automatically clear pre-installed center joint. A vibratory attachment that operates off the spreader power unit can be added that will assure maximum density without segregation even in dry, harsh concrete. Even with vibratory attachment only one operator is needed. Width easily adjusted to meet all paving requirements.

All "Complete Package" Paving Equipment Job-Proved

Blaw-Knox "Complete Package" Paving equipment has become the first choice of contractors throughout the country. Contractors with a spread of Blaw-Knox equipment know that they can depend on its many tested and proved design features plus

one distributor source for parts and service to keep their jobs on schedule. If you are planning to bid on concrete paving, plan to use the only line of equipment with experience—see your nearest Blaw-Knox Distributor today.

For more information on any of these units send for the following bulletins by number—MultiFoote, No. 2616; Road Forms, No. 2370; Finisher, No. 2517; Subgrader, No. 2227-R; Batch Plants, No. 2488; Spreader, No. 2485.



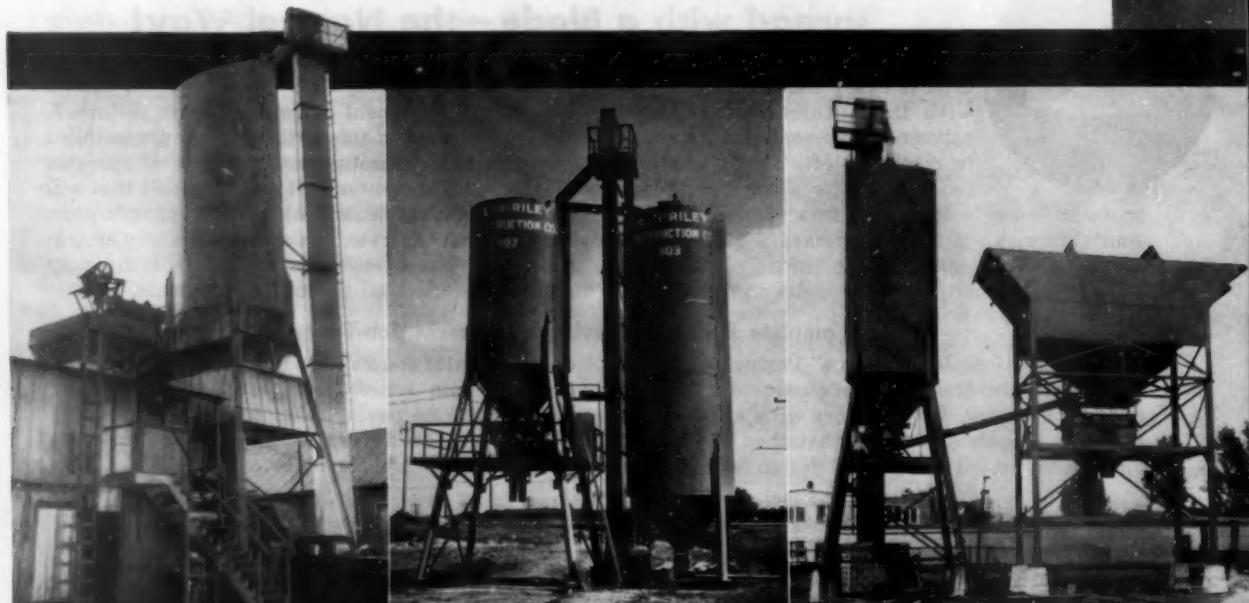
BLAW-KNOX COMPANY
Construction Equipment Division
44 Charleston Ave., Mattoon, Illinois

... for more details circle 250, page 16

ROADS AND STREETS, June, 1957

Here's the Nation's Outstanding Bulk Cement Batching Plant Offer

Long known to be the best engineered plant, increased demand for the Heltzel E-3, has resulted in production economies you'll want to know more about



Standard 609 BBL E-3 Plant provides low cost, large capacity bulk cement operation for Georgia ready mix firm.

Large Indiana highway paving contractor finds his E-3 Plant with recirculator gives him maximum portability, capacity and speed.

New Jersey ready mix operator teams the E-3 with Heltzel's rugged type 200 Aggregate Plant for fastest one-stop batching service.



Illinois paving contractor uses the Heltzel E-3 with extra large ground cement storage to provide high speed batching for modern paving operation. Note piers for addition of third 1000 BBL recirculator.



Ohio paving contractor selected this E-3 with recirculator after comparing with several other makes. He reports the plant is most versatile, fast and exceedingly accurate.

• The Heltzel E-3 Bulk Cement Plant has long been recognized as the industry's finest engineered plant. Now, because of an increased demand, Heltzel has set up a new production facility that has resulted in economies that enable us to offer this outstanding plant at standard equipment prices.

There is absolutely no quality reduction! You get the all butt-welded bin with rounded corners (fabricated by an automatic welding process) that assures smooth flow and guarantees water tightness. You have your choice of Heltzel's patented tubular valves—with or without rotary vane feed. The rugged wide flange, flare-leg supports that mean extra rigidity and truck room! All connections are out in the open, easily accessible for fast, easy erection or dismantling.

Select your capacity—from 250 BBs to 670 BBs—portable recirculators up to 1000 BBs each. Choose your batcher—manual, semi- or fully automatic from 16 to 60 cubic feet including the outstanding Heltzel Twin Batcher designed for high production paving operations. Plants available with "unitized construction"—factory assembled in units for even faster erection and dismantling.

Whatever your needs you will want to get all the facts on this exceptional offer before you buy. Contact your Heltzel representative—or write direct.



THE HE LTZEL STEEL FORM AND IRON CO., 416 THOMAS RD., WARREN, OHIO

... for more details circle 361, page 16



Quoting H.E. (ACE) GREEN, tunnel superintendent: "EIMCO 105 Excavators with heft to dig fast and overhead discharge, are the fastest tunnel loaders I've worked with."



The project was organized on a two cycle, 24 hour timetable with two drill and two mucking shifts. Here, Eimco 105 and dump wagons wait out blasting operations.

Quoting J. E. R. WOOD, president, NORTHWOOD INC.: "The fact that we have four EIMCO 105's is proof we're sure they promote high tonnage production."



WILKES-BARRE, PA. - Operator JOSEPH WEIKEL of Pottsville, Pa., prepares to unleash the EIMCO 105 Excavator's tremendous digging power during Bear Creek Diversion Tunnel operations. His comment: "It's the diggiest machine I've operated."

The 19' circular bore was blasted through 1,750 feet of rock by NORTHWOOD INC. U.S. Army engineers directed the project.



EIMCO 105 SAVES TIME MUCKING FOR TUNNEL DRIVERS

"SAVES MINUTES EVERY CYCLE." That's how AL AITKEN, V-P, NORTHWOOD INC., supervisor of Bear Creek Tunnel operations, describes the EIMCO 105 Excavator's performance.

Part of the \$18 million Bear Creek Reservoir Project, this tunnel will be outlet channel for the 234' high earthen dam. NORTHWOOD, with main offices in Vancouver B.C., is one of the Continent's active tunnel drivers.

Equipped with 1½ yard excavating bucket, the EIMCO 105 loaded 100 cubic yards of material into dump wagons after each blast.

Between 200 and 400 lbs. of dynamite, used in a 48-hole drilling and shooting pattern (usually fired in 10 stages of delay) produced an average advance of 7½' per round ... 15' per day.

The tunnel was drilled to a bore size of 19' in the rough using 6 jack legs on a single deck jumbo. Concrete lining will reduce inside diameter to 16'. Six inch I-beam supports wedged tightly with wooden blocking are spaced every 4'. The EIMCO 105 now is taking up a 4' bottom left to provide flat surface for trucks.

NORTHWOOD'S high appraisal

of the EIMCO 105 is duplicated often in field reports from tunnel projects and mines throughout the world.

With any attachment--Excavator, Front-End Loader, Bulldozer, Fork Lift, and others--EIMCO 105 owners get superior design... performance speed and power... operating ease and economy... versatile maneuverability... dependable service under hard usage.

Plan now to learn why you can shade your next bid and still keep the profit by figuring earthmoving costs around the EIMCO 105.

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B265

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ROADS AND STREETS, June, 1957

Traffic Safety and Control

Florida Adopts Colored Signs for U.S. Routes

The Florida road department has adapted a new system of colored route markers for federal highways. For example, all highway signs designating U.S. 1 are red, U.S. 27 is in green, while U.S. 90 features blue. The signs are considered much easier to see and understand because the traveler has both the color and numeral to guide him.

Made of lightweight Alcoa aluminum with Scotchlite reflective sheeting, the signs are 2 ft. square and have 12-in. high numerals. Route markers have a colored shield on a white background. Route numbers are in white superimposed over the shield.

For alternate routes, colors are reversed. Background numerals are colored; the shield is white. The signs are placed every 2½ miles on alternate sides of the road.

An official color scheme has been adapted by the state, and care has been taken so that no highway crosses another highway which uses the same color. Red, green, yellow, blue, orange, black and brown are the colors used.

Aluminum was chosen because of its light weight, great strength and resistance to corrosion and vandalism. Before the end of 1957, Florida hopes to have the new colored signs on 4,000 miles of the state's 18 federal highways. Florida is the first state to use colored route markers on a state-wide basis for all federal numbered highways. However, Connecticut and the District of Columbia are currently using red on U.S. 1. Florida chose red for U.S. 1 to follow this pattern.

"No Speed Limit" Changed on Kansas Turnpike

Radar checks on the Kansas Turnpike have exploded the theory that the 4-lane 236-mile toll road would become an uncontrolled speedway.

So commented Gale Moss, the Turnpike general manager, who said that six spot radar checks at strategic points on the Turnpike showed the average driver moving at 60.03 mph. "An entirely safe average for our well engineered divided expressway," said Moss.

The speed checks made by the Turnpike patrol at different points

during daily peak periods, showed, however, that 85 percent of the vehicles were traveling at a speed "not to exceed 68 mph". This means that 15 percent were traveling at speeds in the 70 mph and faster categories with no statement made as to the top speed.

Although the original announcement was for an uncontrolled speed limit on the Turnpike, the Turnpike now has been posted from end to end with 40 mph minimum and 80 mph maximum signs and full enforcement of the maximum has been initiated. Changes in the maximum and minimum may be made to fit driving conditions as experience is developed on this new road.

"Jug Handle" Intersection Adopted in New Jersey

The accompanying diagram has been sent out to New Jersey newspapers by the state highway department public relations office to help acquaint motorists of the state with the highway department's program of improving certain arterial intersections.

This intersection design, termed the "jug handle" type, the news release explains, has a special purpose which motorists should understand. Its principal feature is that it provides a separate off-the-highway lane for left-turn movements at intersections.

Three lanes take off from the highway in advance of the intersection, and convey traffic into the crossroad from where it crosses the highway with local traffic under sign.

Besides providing greater safety, the "jug handle" greatly reduces traffic delays which left turns create, this release explained. Briefly, a "jug handle" can be considered as the intermediate degree of intersection control between the simple traffic signal and the overpass.

Since 1954, a total of 48 such intersections have been constructed by the state highway department at an estimated average cost of \$50,000 each. This, according to the news release, is part of the highway department's program of providing maximum safety, within the limitation of available funds, on the state's overburdened and hazardous existing highways.

New "Lower Gear" Signs

Three new types of signs aimed at increasing safety in truck operation have been placed in service on New York highways. The state traffic commission reports that the signs had been requested by Governor Harriman and recommended by his committee on tractor-trailer safety.

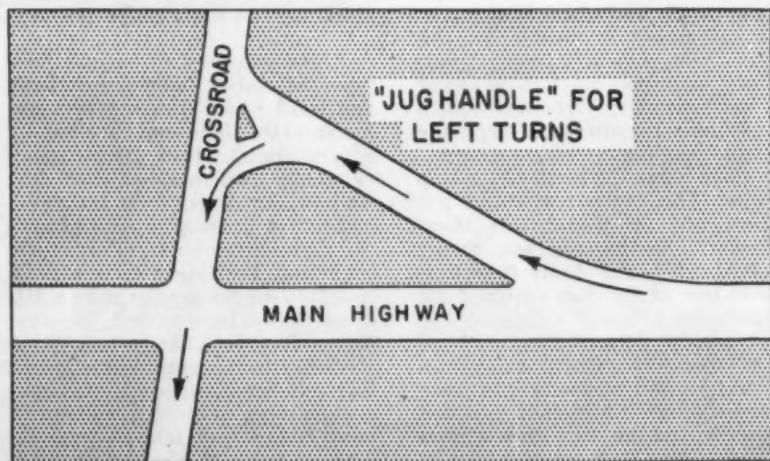
"Lower Gear Zone Ahead" was adopted for use at points 600 ft. ahead of the first sign ordering the use of lower gear on hills. These will go on about seventy hills.

"Lower Gear and Speed Zone Ahead" is installed 600 ft. ahead of signs marking such zones on five of the steepest and longest grades.

"Truck" is placed atop the other new signs when the regulations apply only to trucks and tractor-trailers.

"Absolute" Speed Limit

• An "absolute per se" state speed limit of 60 mph by day and 50 mph by night has been recommended by 12 midwestern safety leaders.



• New Jersey construction for voiding left turns at busy intersections.

Problems of a County Engineer

When a Big Dam Job Comes Along

How federal-county relations resulted in a relocated farm-to-market road (after some tribulations) is told in this summary—which reminds that regional planning has its problems also at the local level.

By Pat Thomson

County Engineer, Douglas County,
Waterville, Washington

THE CONSTRUCTION of any large project dam is apt to disrupt some of the local highways. A project the size of Chief Joseph dam in this area of Washington was certainly no exception. As the dam progressed it soon became apparent that its construction would affect certain county roads.

One such route is our Pearl Hill road. Our problem began when the first construction haul road for the dam cut across this road at a point where our grade was 12 percent. Euclids hauling waste rock came snorting through. Local traffic here consisted of school buses, farm people and wheat haul trucks. It was almost impossible for this traffic to stop on a 12 percent grade at the haul road junction on wet or frosty mornings. Frightened women and irate parents soon kept the phone jangling.

Then began the battle of the stop signs. The contractor would put them up; we would tear them down. This impasse was finally solved when the Army Engineers in charge of the dam required the contractor to install a flagman.

Near the dam, the county road was crossed by a narrow-gauge railroad transporting concrete to pouring locations. Electrically operated gates barred the road when a train approached. Mule teams owned by old-time citizens were a problem

here. You can imagine the explosive reaction of these animals to the shrill blast of a locomotive and a light-flashing crossing gate. For a time we tried to placate these citizens.

A spirit of cooperation has characterized all our dealings. Therefore we were somewhat surprised that a county road flooded out by the reservoir was omitted from the replacement schedule. Contact with the Corps office resulted in a ground investigation and necessary preliminary surveys for a relocation of the road in question.

Thus the county entered into contract with the Corps of Engineers for an \$86,170 relocation project, and early in October of 1956 a contract was awarded to Murphy Brothers, Inc., Spokane, Wash. Work began in November.

The original road had been on the natural flat gravelly river bench where construction consisted mainly of ditching and draining. This line was now under water, forcing the new location road into the steep coulee walls lying in an almost per 1½:1 slope. Consequently slopes had to be chased clear to the top break of the hill. These sliver sections were thin, so actual construction practice meant undercutting to prevent "sluffing," then back to grade on the lower slope portion.

There appeared to be only two types of soil—a light floury sand and solid rock. However in some instances the light sand gave way to a very grainy, clean granite sand extremely hard to move when dry. And in the deeper cuts staggered layers of a peculiar grayish glacial till were encountered. This muck could not be ripped even with a hydraulic ripper pressured by a D8 dozer. It was hard to drill, for even though it smoked like rock, it had a clay-like sticking consistency. Holes had to be on a 5-ft. grid to transmit enough shock to break it, and maximum hole depth was about 6 ft. This material had to be handled and paid for on a solid basis.

Solid excavation was not a large quantity—about 12,000 cu. yard—but it was also difficult to handle. Part of the solid was in boulder form ranging from 3- to 10-cu. yd. stones requiring individual drilling and shooting. The remainder was in thrusting ledges so steep that drilling could not be done from the top. Shooting was done from the front face in about 40-ft. lifts, using a Gardner-Denver Air Trac drilling unit. Cut and fill quantities were balanced closely. Cut excavation went into the adjacent fills, or cuts were "daylighted" to accommodate the contractor so that shovel loading was not necessary. The rock from each shot was dozed into position using Allis Chalmers HD-20 dozers.

Our job work-up for this relocation attempted to blance grade on a 1,200-ft. split to evade overhaul. With 70-ft. fills and 40-ft. cuts, this was impossible in all cases so we resorted to waste and borrow rather than excessive overhaul. Paid on a unit basis, one unit of overhaul was 1,000 station yards of overhaul divided by 100, with prices ranging from 40 cents to \$20 per unit.

As a further example of good cooperation, the Army Engineers furnished for surfacing a stockpile of $\frac{3}{4}$ - $\frac{1}{4}$ -in. screened aggregate wasted. Our cost of placement including dead haul was \$1.60 per cu. yd.

A problem in fill construction along the reservoir was related to the sharp fluctuation of the pond level. Thus water-line movement forced us to consider a back-up problem on the major canyon crossings for roads skirting the reservoir. To go upstream in each canyon enough to escape the back-up destroyed good alignment completely. Crossing the face of each canyon meant these fills would be sitting in from 6 to 8 ft. of water most of the summer months. Consequently the contractor was required

to provide a rock embankment protection up to 5-ft. thickness. Rock consisted of sizes from $\frac{1}{3}$ to 2 cu. ft. with a covering of compacted fragments of not less than 4-in. diameter.

Right-of-way agreement called for 12-gauge barbed 3-wire fence on wooden posts set each rod. This went for 30 cents per lin. ft. The same agreement called for two cattle guards, concrete base, wooden deck, at a bid price of \$900 per guard complete.

The relocated road opens a large area of orchard productive land, now that water level is within equitable pumping range. Recreational features of boating, swimming and fishing will also be available. Thus in our county there has been an excellent unlimited cooperation from the Corps of Engineers, indicating that a federal and county agency can work together on local problems that inevitably arise when a large dam is undertaken.



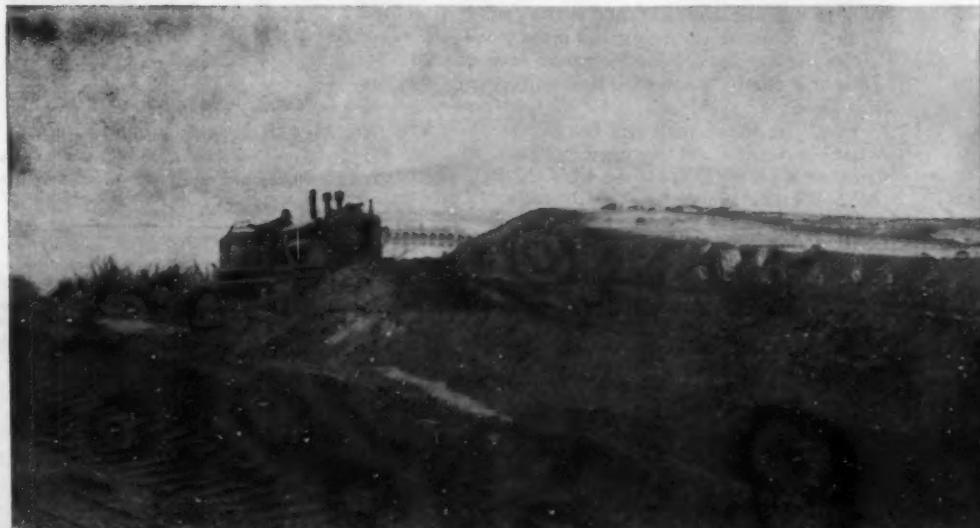
● Three dozer units pioneering the opening trail across a 70-ft. fill area. In foreground—largest fill on the project with an approximate 30-ft. cut on each side of it.



● On the sidehill cut-and-fill portion of the project, an HD-20 hauling a LeTourneau-Westinghouse Carry-all. Contractor worked in below-zero weather.



● In some of the cuts, a gray clay-like glacial till was encountered that had to be handled like rock. It drilled hard, sticking the bits, and required a short grid before it broke.

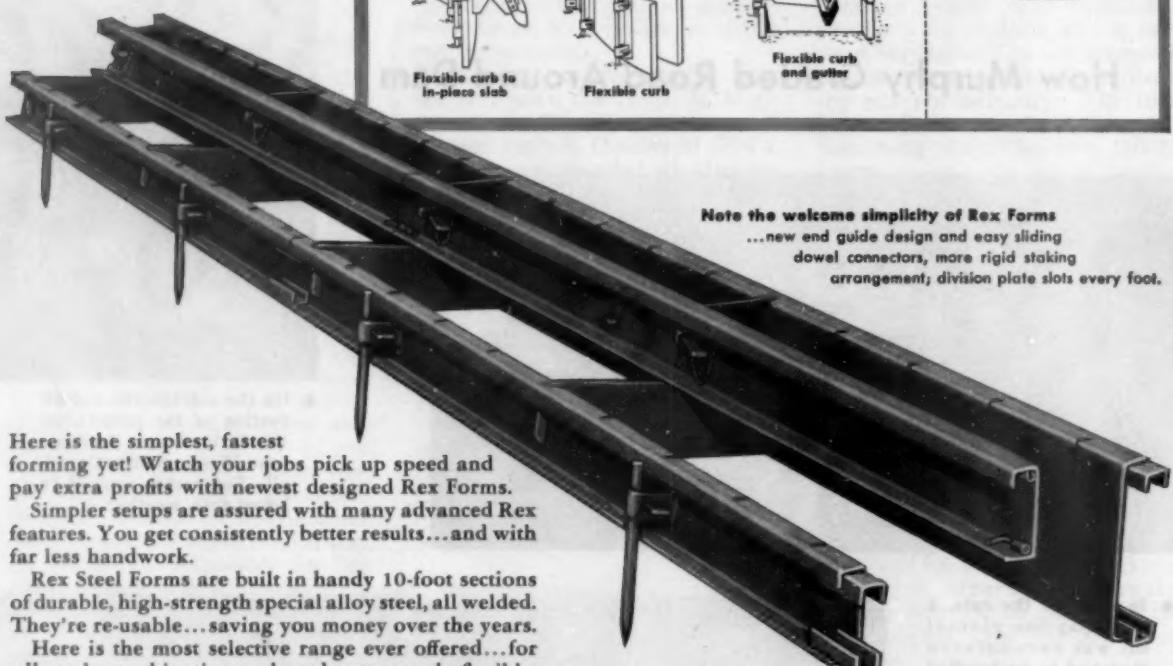


● An Allis-Chalmers HD-20 cable dozer unit opening one of the 30-ft. cuts in the silt-sand.

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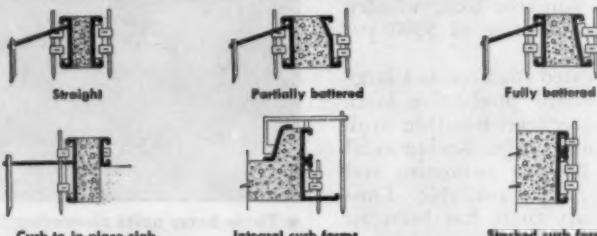
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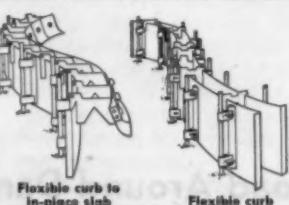
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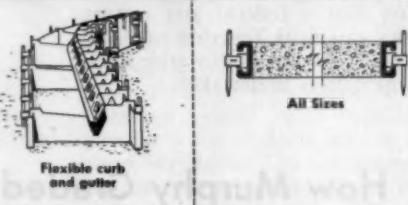
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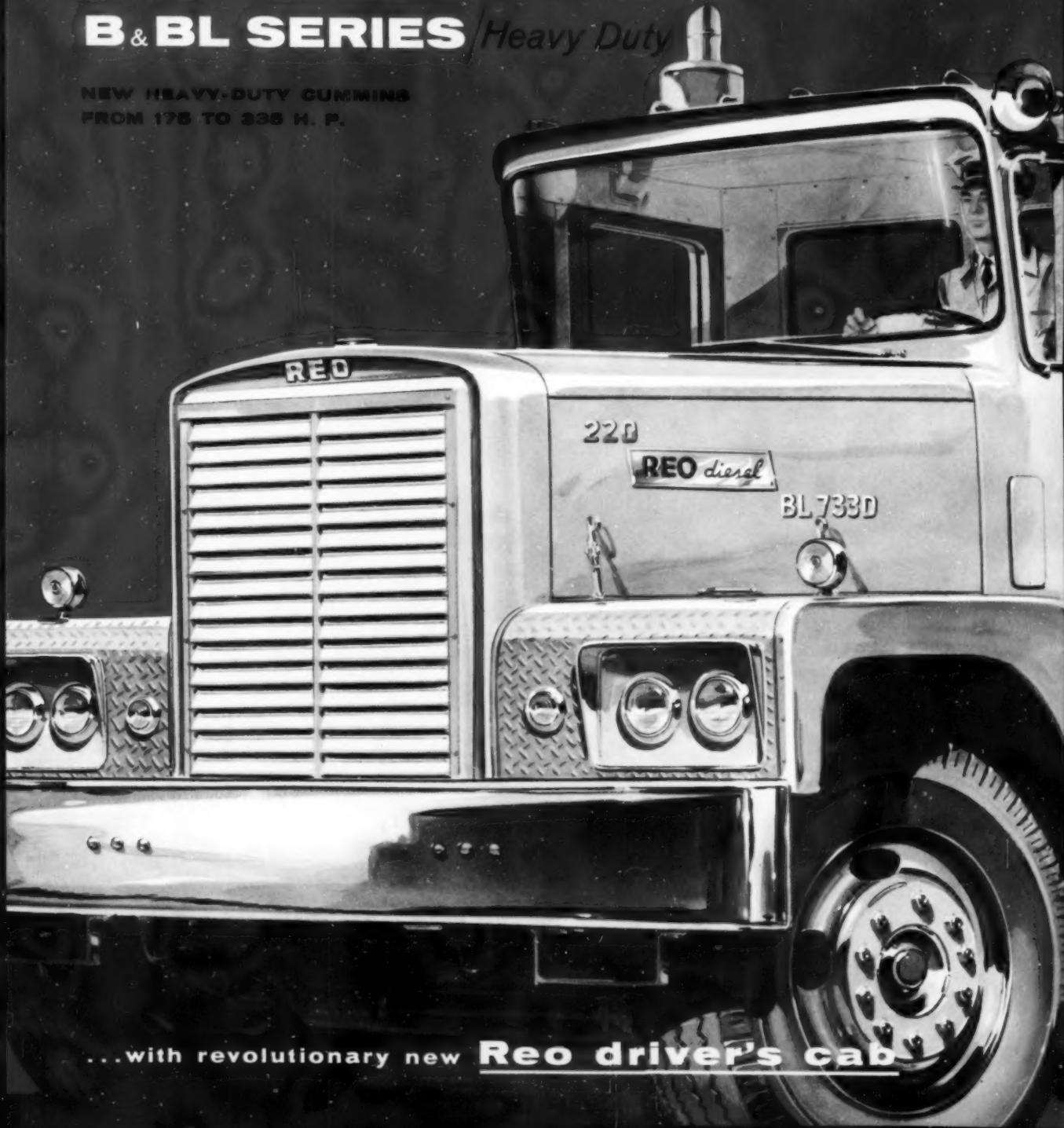
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... for more details circle 259, page 16
ROADS AND STREETS, June, 1957

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NEW HEAVY-DUTY CUMMINS
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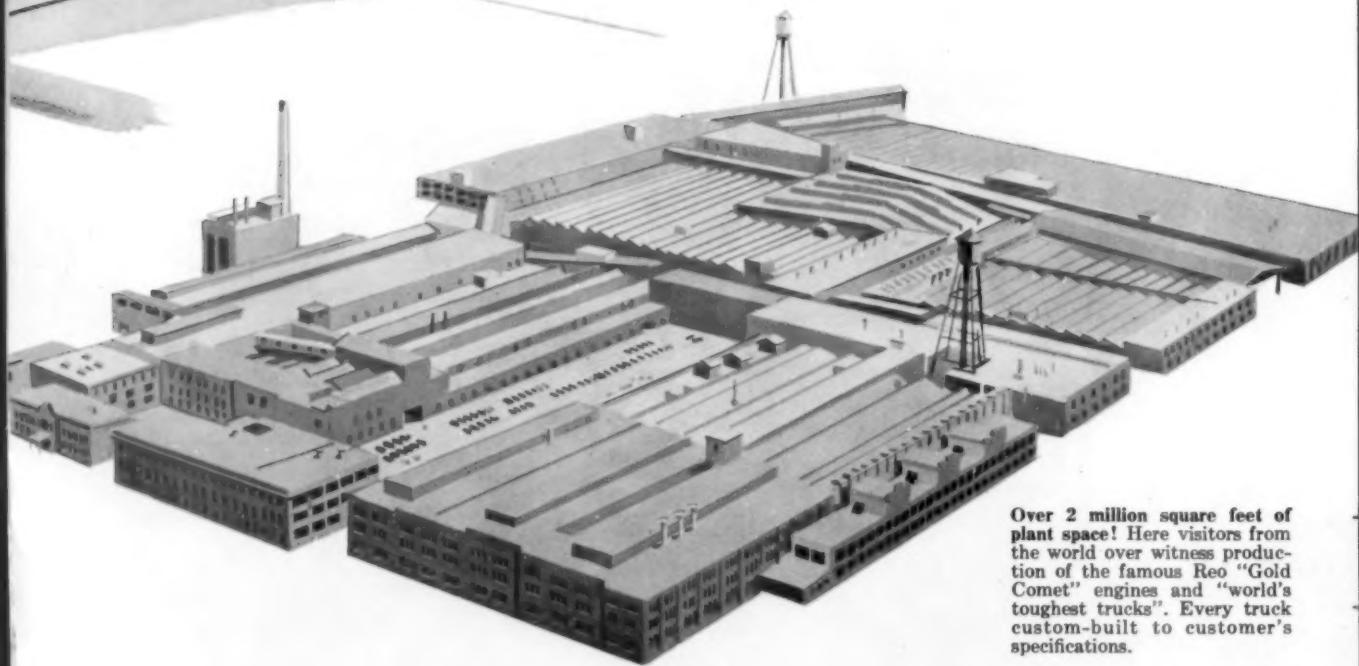


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Over 2 million square feet of plant space! Here visitors from the world over witness production of the famous Reo "Gold Comet" engines and "world's toughest trucks". Every truck custom-built to customer's specifications.



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New roominess under hood for ease in servicing engine. Husky "Catwalk" fenders, with "diamond" safety treads.

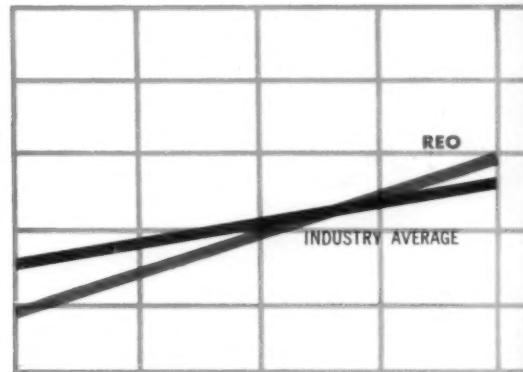
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Reo's New B Series Diesels are brand new. They are the result of extensive research and testing to find the perfect cab for *all* drivers . . . in all operations . . . and under all conditions. They introduce a new concept in driver comfort, convenience and safety—from the Bostrom "Level Ride" seating to the "Panoramic Vision" slopeback windshield . . . from the flat floor and living room spaciousness to the visibility of instruments and convenience of controls.

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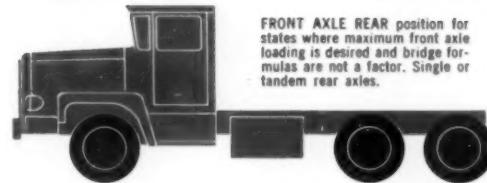
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Reo sales gain in 26,000 lb. and over GVW class exceeds that of the industry during last 2 years. "Heavy" trend is to Reo.



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Gold Crown engine built by Reo for its early trucks. Predecessor of Reo Gold Comet.



Reo Speed Wagon, introduced in 1915, set new standards in commercial transportation.



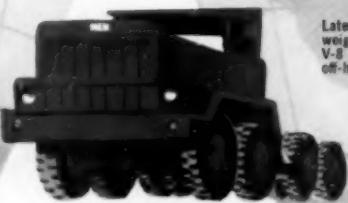
Reo Gold Comet "Six" revolutionized the industry with introduction of "wet sleeves".



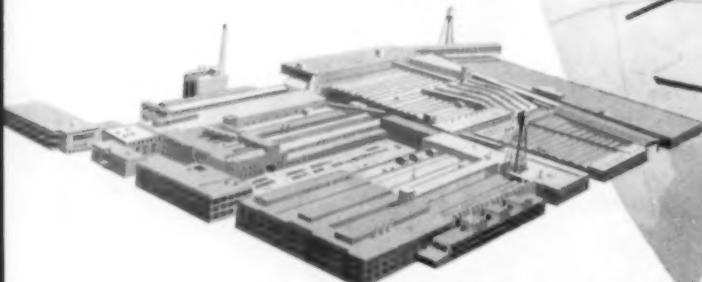
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527X

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ROADS AND STREETS, June, 1957

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Virginia Citizen Group Helps Hold Town Meetings



- A strong newspaper publicity campaign to describe the Interstate system was launched by the Virginia highway department's public relations director, Harry Smith. As an experienced former newspaperman, Mr. Smith knew that the proposed new road locations were "hot" news, and made the most of the situation. His department prepared a series of features and numerous news releases for dailies and weeklies as well as radio and television material.

How to "Sell" Your Interstate

By Duane L. Cronk
Washington Editor of Roads and Streets

100 meetings in 35 cities . . . that's the record chalked up by the Virginia Better Roads Committee and the Virginia State Highway Department in a four-month effort to tell the people along proposed Interstate system routes how the new highways would benefit their communities. All these educational sessions were held several weeks before the first mandatory public hearing on specific route location.

AN ESTIMATED 85 per cent of the new 41,000-mile national system of Interstate and Defense highways will be on new location. Thousands of homeowners in large cities will be affected by six and eight-lane expressways cutting through their properties. Hundreds of small towns around the nation will be by-passed. Along the old routes numerous roadside enterprises will be left stranded in their present form, as traffic diverts to the new facilities.

Pacifying these irate citizens—and persuading the rest of the community to accept the wisest engi-

neering location over the minority's protests—has become the Number One public relations problem of state and city highway officials. The federal law requires that hearings must be arranged to give interested parties an opportunity to support or protest the department's proposed plans or location. Unless such hearings are handled adroitly, many projects will be delayed unduly.

Here is the story of how the businessman of one state, recognizing the merits of the proposed Interstate routes, backed the highway department to tell the people of the state how the new system

Anticipate the Questions, Have the Answers Ready

Advance preparation is a "must," Virginia officials insist, for the officials conducting a public hearing. "We go over the local project until we feel we know it thoroughly—the proposed location, the interchanges and other provision for access, the anticipated effect on local business and every other problem we can think of. Then we go over it *again . . . and again*."

At the hearing itself, the procedure is to:

- Show slides of general location of old road and adjacent road network.
- Explain how location studies were made.
- Cover any special conditions, such as location

through business areas or by-pass of villages.

- Show typical design sections of the new highway, provision for service roads, interchanges and future traffic load.
- Estimate cost of right-of-way and construction along the recommended line, the alternate lines and the old road.
- Explain control of access and how it will work to the benefit of the user. Explain provisions for adjoining landowner, such as where cattle or pedestrian underpasses will be built, how school buses will operate, where cross roads will be carried over.

would benefit their communities. Their methods and their success in a difficult "selling" job may be of some value to other officials and highway interests, whose most pertinent problem today is one of winning public approval for local projects.

* * *

In Virginia, the state highway officials are facing their knottiest public relations problem—telling the people of Abingdon and Pulaski and

Staunton and dozens of other communities that the newly approved national system of Interstate and Defense highways will slash through their backyards or by-pass their city limits entirely. According to the Federal Highway Act of 1956, every adversely affected citizen must be given opportunity, in a public hearing, to express his disapproval. It's the Virginia highway department's job to defend the proposed location and marshall enough support from the majority who

Location and Design Policies

will benefit to override the enraged and very vocal minority.

Fortunately the engineers in Richmond are getting some help. Weeks before the first public hearing was held, a small but energetic committee of businessmen organized for the express purpose of selling modern highways to the people of

Virginia—even if it meant limited access and bypasses. Before the first legally required hearing was held on location of an Interstate route, the committee sparked meetings in 35 cities along the proposed system. Over a recent period of four months, this fast-running grassroots campaign provoked

(Continued on page 104)



• Top Virginia highway officials discuss proposed routes for the state's Interstate system of highways. J. A. Anderson, commissioner; R. P. Ellison, executive assistant; J. P. Mills, Jr., traffic and planning engineer; F. A. Davis, deputy commissioner and chief engineer; and D. B. Fugate.



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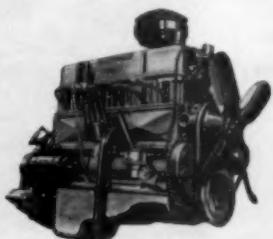
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- Long-wearing Moraine bearings



FAMOUS CHEVY 6

(America's most popular truck engine)

- Fuel-saving 8 to 1 compression ratio
- Low-maintenance valve-in-head design
- Durable alloy steel exhaust valves
- Economical bypass cooling
- High power-output ignition
- Two fuel filters for dependability





STAYS ON THE JOB...SAVES ON THE JOB!

You can't take it away from these big Chevies—they're the dollar savers *de luxe* of the American road! One fact bears this out completely: men who depend on trucks for their living consistently prefer Chevrolet over all other makes, consistently put Chevy at the head of the class in popularity.

There are lots of reasons why, and many of them can be found beneath the Chevrolet truck hood. That's where you'll often find one of the great 6-cylinder powerplants (Thriftmaster or Jobmaster) that have pulled more payload more miles than any other engines in the history of hauling. They're honest-to-goodness *truck* engines, specially built to *stay* and *save* on the kind of jobs that test a truck's stamina every day in the week.

And the husky V8's that hum beneath the Chevy hood offer the same brand of economy and dependability—as well as a new measure of fleet-going V8 efficiency.

You won't find features to equal all those listed here (see preceding page) in any other truck V8's today.

But ideal truck power isn't the only reason why Chevy's the top dollar saver—not by a long shot! You've got to go even deeper to see the whole picture; down to the smooth, durable Synchro-Mesh manual transmissions and modern automatic drives, the big, long-lasting brakes, the mighty forged-steel axles.

You'll find that a Chevrolet truck gives you *so much* to save with! We've only hit the high spots here, but your Chevrolet dealer is waiting to fill you in on the rest. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



Biggest sellers . . . because they're biggest savers!

CHEVROLET TASK-FORCE 57 TRUCKS

... for more details circle 280, page 16

ROADS AND STREETS, June, 1957

ON THE NEW INDIANA

American Welded Wire Fabric in the road...

Welded Wire Fabric-reinforced



CRACK CONTROL! Since it keeps the road surface smoother, American Welded Wire Fabric helps make the new Indiana Toll Road a *safer* road, as well as a better-riding and more durable road. American Welded Wire Fabric now comes in a complete range of wire sizes up to and including $\frac{1}{2}$ " in diameter, 2", 3", 4" and 6" on center.

Why 95% of all toll roads are reinforced with steel!

LONGER LIFE—Distributed steel reinforcement, such as American Welded Wire Fabric, extends pavement life because it adds 30% to the strength of concrete slabs.

GREATER SAFETY—Steel Wire Fabric reinforcement controls cracking, keeps the pavement smooth and makes it safer to drive on.

LOWER COST—By extending pavement life and because Wire Fabric-Reinforced concrete pavements can be built with fewer joints, steel reinforcement reduces maintenance costs and lowers long-term cost of any concrete road.

SMOOTH RIDING! Specially designed American Road Joints were used on the Indiana Toll Road to keep the long slabs in proper alignment and provide an especially smooth ride. These joints assure adequate load transfer for a balanced pavement design.



USS American Welded Wire Fabric

USS Multisafy Cable



UNITED STATES STEEL

TOLL ROAD...

Multisafy Cable Highway Guard along the road...
concrete pipe under the road!



SAFETY, OFF THE ROAD! It is impossible to prevent accidents completely. But here is one way to minimize damage—and injuries: Install American Multisafy Cable Highway Guard along the side of the road, as they did here on the Indiana Toll Road. It is the only guard rail sold that was designed for definite miles-per-hour protection based on extensive testing. The combination of resilient steel cables, plus spring-steel offset brackets, cushions the shock of any collision, and restrains the vehicle, too. American Steel & Wire also makes beam-type highway guard.

GOOD COMBINATION! Portland cement concrete and Welded Wire Fabric reinforcement have been for many years, and remain today, the best and most economical and durable combination of materials for culverts, sewers, and force mains. Wire Fabric Reinforcement gives the concrete culverts on the Indiana Toll Road the greater strength needed for long life.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NEW TECHNICAL LITERATURE

The catalogs and brochures describing the uses and advantages of the various construction materials made by American Steel & Wire have been revised and brought up to date. You need the data in these booklets, if you use or build with concrete. Send for your free copies.

Highway Guard

... for more details circle 241, page 16

ROADS AND STREETS, June, 1957

American Steel & Wire
Dept. 5F-67, Rockefeller Bldg.
Cleveland 13, Ohio

Please send complete information on the following products:

American Welded Wire Fabric for Portland Cement Concrete American Welded Wire Fabric for Asphaltic Concrete American Welded Wire Fabric for Airport Runways American Road Joints Multisafy Cable Highway Guard American Beam-type Highway Guard American Wire and Strand for Prestressed Concrete

Name

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State

UNIT MODEL 510

THE NEW UNIT *Challenger* ...with CLAMSHELL



It's BEST to INVEST in UNIT...

because UNIT's advanced design gives you Self-Aligning, Replaceable Hook Shoes... Straight-in-line Engine Mounting with Torque Converter... Hydraulic Actuated Clutches... Modern Transmission with Involute Splines... One Piece Cast Gear Case... Alloy Steels and Forgings... Force Feed Lubrication and many other UNIT advantages. These life-prolonging features are contributing substantially to the performance and efficiency of each machine. And they explain why UNIT equipment is so universally acceptable.

See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



UNIT CRANE & SHOVEL CORP.
6407 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!



A8302-2/5PC
... for more details circle 339, page 16

New York State Engineer Gets \$2,000 for Suggestion

An award of \$2,000, said to be one of the largest ever given a state employee for an economy suggestion, has been presented by Gov. Averell Harriman to Frank W. Springsteen of Troy, N. Y. Springsteen, an engineer in the department of public works, proposed a method of obtaining copies of con-



• Frank W. Springsteen, left, engineer in the New York state department of public works, receives a \$2,000 check from Gov. Averell Harriman.

struction plans and proposals which will result, it is estimated, in annual departmental savings of about \$100,000.

Springsteen suggested the use of xerography—a dry, electrostatic copying process—in the preparation of offset paper masters from which multiple copies of drawings and specifications are quickly and economically run off.

He explored various methods that might eliminate some phases of time-consuming reproduction and drafting work. On his own initiative he investigated techniques used in private industry that could be appropriately geared to his agency's needs. The plan he devised specified Xerox copying equipment made by the Haloid Company.

Approve Construction of First Canadian Toll Road

Canada's first modern toll road will be built by Quebec Province, linking Montreal to the approaches of the Laurentians, a popular Canadian resort area, to the northeast and lying north of the St. Lawrence river.

The provincial legislative assembly has given unanimous approval to a bill setting up a toll road authority which will construct and operate the six lane highway extending 29 miles. The estimated cost of the project is \$40 million. The road will have two major bridges and 48 underpasses and overpasses.

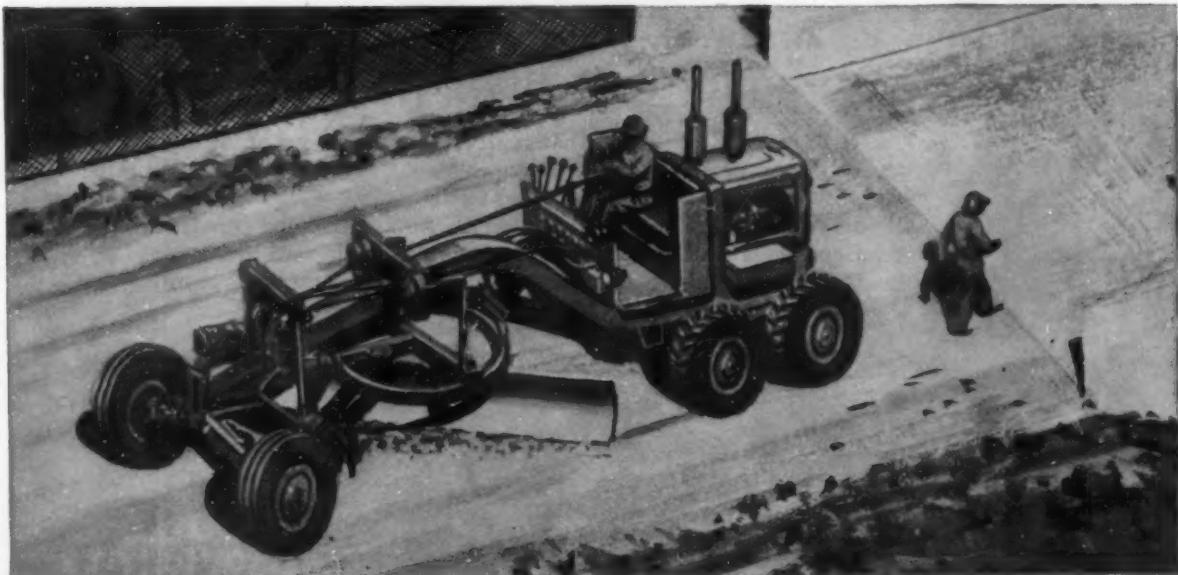
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... for scrapers, graders, dozers, and allied equipment.

CF&I Cutting Edges have an unmatched reputation with the Nation's roadbuilders. And for good reasons, too! Every CF&I Cutting Edge is carefully made from special analysis steel that's chosen for its resistance to abrasion and fatigue, then scientifically hot rolled, punched and inspected to make sure it's perfect.

For all earth-moving jobs—especially the tough ones—you'll find it profitable to choose CF&I Cutting Edges. What's more, they are available in a wide variety of lengths, widths, thicknesses, and hole spacings . . . flat or curved, with beveled or square ends, and in different finishes.



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ROADS AND STREETS, June, 1957

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Another Outstanding Record for Stronger-than-Steel NYGEN[®] CORD

High in the Rockies, on what contractors agree is one of the most difficult rock projects ever undertaken, General Truck Tires daily are proving that they're built tougher for the toughest jobs. Unexcelled for strength and durability with *exclusive* Nygen Cord construction, Generals provide the absolute maximum in job-hazard protection. Let them prove their worth to you *now* on your toughest assignment.



**specify GENERALS on
your new equipment**

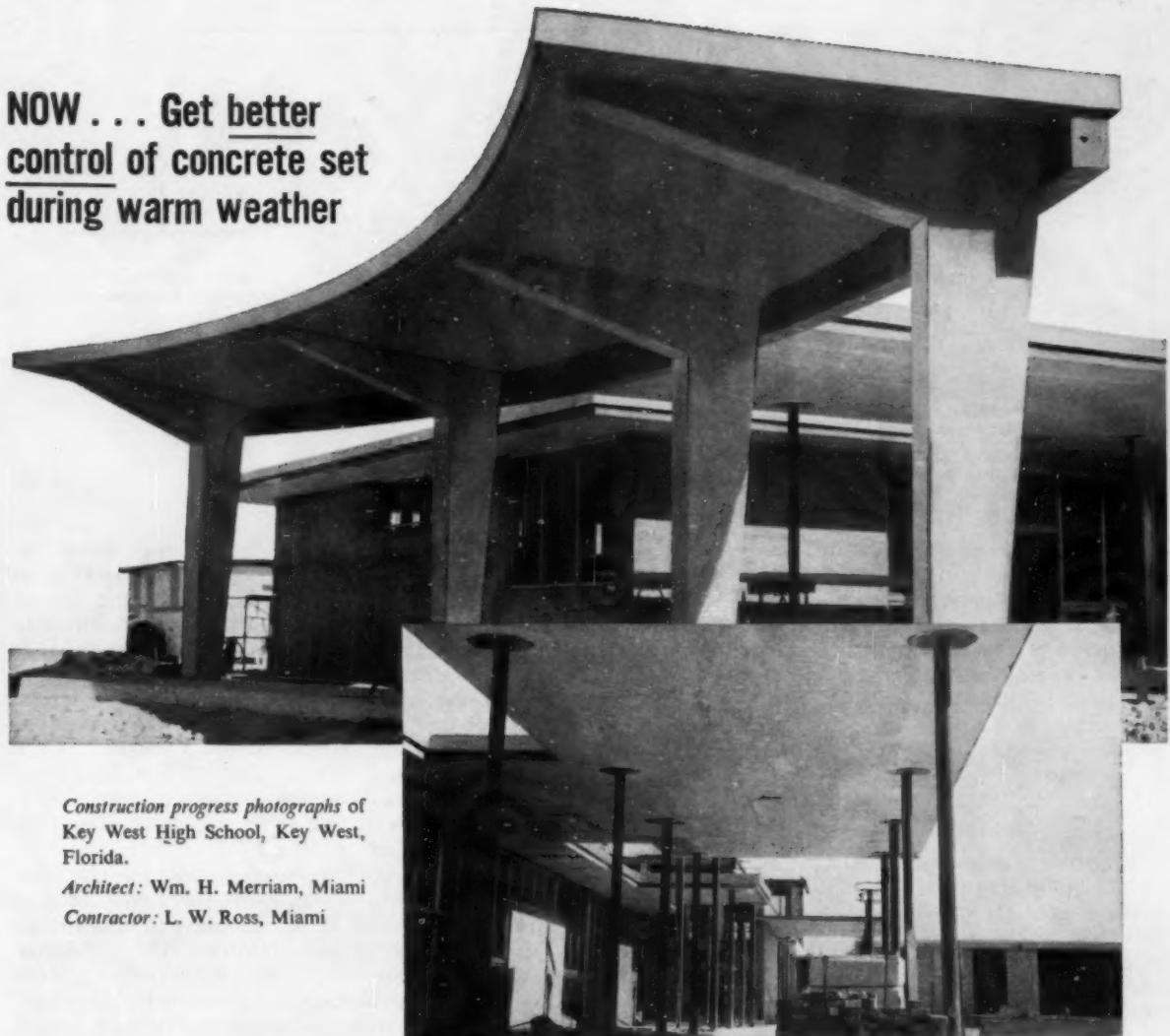
**THE
GENERAL
TRUCK TIRE**

THE GENERAL TIRE & RUBBER CO. • Akron, Ohio

... for more details circle 283, page 16

ROADS AND STREETS, June, 1957

NOW . . . Get better control of concrete set during warm weather



Construction progress photographs of Key West High School, Key West, Florida.

*Architect: Wm. H. Merriam, Miami
Contractor: L. W. Ross, Miami*

use SONOTARD

This economical and efficient admixture retards the initial set of concrete and mortars! It gives you effective job control in designing, mixing, placing, and finishing concrete over a wide range of job conditions. In addition, you get these important results at low cost:

1. *Greater ultimate strength*—Up to 40% higher ultimate strength!
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3. *Better finishes*—Denser surfaces are available because Sonotard permits greater facility in tooling, floating and troweling!
4. *Savings in materials*—Greater strengths permit extension of aggregates, or reduction of cement up to 15%, without sacrificing strength or workability!
5. *Greater resistance to moisture migration*—Permeability is reduced 25% to 40%!
6. *Sounder concrete and mortar*—Reduces bleeding and segregation!

... for more details circle 323, page 16

ROADS AND STREETS, June, 1957

For further information on SONOTARD simply fill in the coupon below!

A Product of **Sonneborn** RESEARCH

For over 50 years manufacturers of quality building products. Makers of
LAPIDOLITH CONCRETE HARDENER • **COLORCOAT** • **HYDROCIDE**
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We are interested in further information on SONOTARD for better control of concrete and mortar mixes.

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● Showing the 1,012 miles of designated Interstate system routes in Virginia—of which only 15 miles presently are of controlled-access design.

more discussion of highways in some communities than had been stimulated in years. And the whole endeavor cost "pennies."

The results have been inspiring. State highway engineers at this writing have held the first ten official hearings on Interstate projects—all of them in towns previously "exposed" to the benefits of the program by the businessmen's committee—and they have found opposition has been reduced to a minimum.

A Tough "Selling" Job

Virginia is no exceptional state in the problem of selling the Interstate system, unless, perhaps, her highway officials have a tougher than usual assignment. Here's what they are up against:

- There is only one limited access highway in the entire state, and that is a short stretch in the extreme eastern part, 400 miles from the opposite corner. Virginians don't know what "control of access" means. Yet 1,012 miles of the Interstate system will be constructed in the state. The Virginians are totally unprepared for it. H. H. Harris, chief engineer of the department, says, "One of our most difficult problems will be to sell the public in rural areas on the need for full control of access. Many property owners just do not understand why this restriction is necessary."
- Sixty towns will be bypassed by the new routes, almost every one of which has seen the main stream of traffic flow through the center of town for decades.
- The state is predominantly rural. Emphasis has been on secondary road development for years, and there will be, undoubtedly, active resentment against modernization of the state's primary highways—particularly the ultra-modern Interstate roads.

Help From the Businessmen

Fortunately, the department has not been alone in its public education program. A little over two years ago, the Virginia state chamber of commerce began to take an active interest in the state's high-

way dilemma. At that time, the legislature was facing up to Virginia's discouraging backlog of road construction needs. The incoming governor devoted fully a third of his inaugural address to recommendations for increased taxes to finance new roadbuilding. The businessmen's organization, sensing the stake of industrial and commercial interests in good highway legislation, formed a Better Roads committee. Its 44 members (since raised to 54) represented a broad sweep of business activity—newspapermen, lawyers, bankers, as well as highway industry suppliers, truckers, motorists, and roadbuilders.

During its first 18 months of existence, the committee met frequently to study the importance of Virginia's highways in its economy, to appraise its construction needs and to review the legislative formulas by which state and federal funds were distributed to secondary and primary road systems. Within a short time the committee became a hard core of laymen who were unusually familiar with the state's road problem and fully aware of the immediate steps necessary to renovate her highway systems.

New Problems Arise

The businessmen hired a transportation economist, authorized a thorough study of the situation and used the report as the basis for a number of legislative recommendations.

Then Congress completed debate on a federal-aid road bill and drafted the National Highway program.

The committee immediately recognized a new set of problems. The increased federal assistance would undoubtedly ease the state's financial impasse and the 1,012 miles of Interstate system superhighways authorized throughout the state would provide the primary system backbone network so sorely needed. But the businessmen sensed that a rural-minded citizenry would resent the *general* improvement of major routes and that individuals and enterprises displaced by the new locations would oppose *specific* projects. They decided to continue their broad education program,

but in addition to "see the Interstate System"—concentrating on villages and cities along the proposed routes, explaining the greater benefits of the new highways and easing the way for the public hearings to follow.

They had to move fast. Working with local chamber of commerce secretaries and with service clubs, the state chamber committee was successful in arranging dozens of meetings in communities along the Interstate routes.

There was no high-pressure publicity drive, no large paid staff, no formal procedures. Several of the most conscientious committeemen made it a point to contact local chamber secretaries and service club officials. They merely pointed out that the city was on the proposed Interstate route and that its construction would materially affect the business community. If a meeting were arranged, they volunteered, the committee would be happy to provide a speaker and state highway department engineers would be available for the same purpose.

The word got around. On August 16, 1956, the first meeting was set up in Fredericksburg. More than 450 businessmen, civic leaders and public officials attended. The historic city, where George Washington reportedly chopped down the cherry tree and where five major battles of the Civil War were staged, would be by-passed by the new Interstate route.

Fredericksburg was typical in this respect to most of the Virginia villages to be by-passed. The state is rich in tradition and historic lore. It depends heavily upon tourist trade, and local leaders in these communities were afraid that motorists would be diverted around many of the tourist attractions. (For this reason, Virginia state engineers are giving considerable study to signing and other methods to alert the driver to nearby points of interest.)

A Softening Process

This was the first opportunity for many in the audience to hear how the new national highway program would affect Virginia and how their community could expect to benefit. Because exact location of the by-pass around Fredericksburg had not yet been determined, discussion of that point could be only general. The Better Roads committee was working in the belief that before the public hearings came along and disagreements center on location, the broad aspects of the program and its merits should be publicized. Active support must be developed to offset the opposition which will naturally arise.

Both state engineers and committeemen



• That's a good question! . . . Here are sample pages from highway department's new two-color booklet explaining the benefits of access control.

addressed the Fredericksburg meeting. In many instances thereafter, state officials appeared alone at local meetings. Commissioner J. A. Anderson and other top highway officials made an estimated 150 appearances during this brief period of public interest in the Interstate program. The Better Roads committee, before publicizing their program, had received the department's enthusiastic endorsement of their endeavor. As General Anderson put it: "We can't very easily invite ourselves to be major speakers at club meetings, but we surely do welcome every opportunity that someone else creates."

The Fredericksburg meeting was widely publicized. Within a few days, requests for speakers were received from cities scattered along the whole length of the proposed north-south Interstate route. Down in the southwest corner of the state, Marion chamber of commerce leaders arranged two meetings for successive evenings. Four service clubs—the Lions, the Rotary, the Kiwanis and the Civitan—met jointly in special session to hear the highway engineers.

The newspaper publicity about the Marion meetings sent the Rotary club secretary in Wytheville, the next town up the line, scrambling for the telephone. State highway officials told him they would be happy to come and talk about the new road.

Within days, Pulaski, the next town to the north, had arranged through the Better Roads committee a meeting of businessmen and called upon the state highway department for speakers. Several



- If you want to sell the people on the merits of the Interstate system, you have to start with "controlled access"—the feature which makes increased capacity, speed, comfort and safety possible. And you have to be prepared to argue that these advantages are far greater than the damage which a few property owners will suffer. The Virginia highway department developed an attractive two-color booklet to tell this story, as well as a color motion picture which received wide showing over the state's television channels.

engineers made the engagement. "I think that after we got through the meeting they had an entirely different concept of how the Interstate road was going to affect them," one speaker told Roads and Streets.

The backstage maneuvering of the Better Roads committee to promote special meetings was supplemented by renewed efforts by the department's public relations department to publicize the Interstate system in the press. PR director Harry Smith drafted a running series of special stories on the system, its safety and engineering features, and how it would benefit the state. They received wide coverage.

A 12-minute color motion picture on control of access was developed (incidentally, at very low cost for such a project) and shown by all the television studios in the state as well as at numerous meetings.

Prepare Brochure

To further promote the merits of a limited-access type of highway, a special two-color brochure was produced. (Typical pages here reproduced.) The public relations department's excellent working relationship with newspaper and radio men paid off on this occasion of need for an unusual amount of coverage.

This official publicity, plus the radio and newspaper coverage of the 100 meetings, brought a substantial amount of information about the Interstate system in Virginia into the communities involved. The immediate result has been a clearly apparent shift in public opinion. Thanks to the "pre-selling" efforts of the department and the Better Roads committee, officials are saying that far less opposition than expected is being registered at the public hearings. For example:

- In Emporia highway officials or Better Roads committee members addressed two service club meetings. In the public hearing held a few weeks later to discuss location of the new route, a good many of these businessmen attended, and by their support of the department's plans indicated a sound understanding of their merits. None of the objections filed was by a party who had attended one of the good roads meetings, although many were affected.
- In Wytheville there was no opposition to the proposed by-pass or limited-access features of the Interstate road at the official hearing. Officials credit the efforts of the Chamber of Commerce leaders and the community meeting with this evidence of support.

The Virginia state chamber of

commerce is convinced it should continue its Better Roads committee work. Future plans include publication of a small pamphlet on the advantages of modern highways which it can distribute at future meetings. It will press for sound state legislation. It will seek to establish local better roads committees and to spark community meetings—either by local chambers or service clubs.

Tell Everybody

In fact, the committee now feels that villages not on the Interstate system should be penetrated also. Its businessmen members realize that unless rural interests, particularly, are told that 90 percent of the money for the big superhighways is coming from Uncle Sam and that the highway department will not neglect the secondary roads, there may be a wave of misguided opposition to such construction.

Outright expenditures for committee activities have come to only about \$8,000 in its two years of existence, an amount contributed by business and highway industry organizations. The state chamber has absorbed much of the paper-work in its own workload and members of the committee or their organizations have financed their numerous trips and appearances. The major expenditure was for the research project and report on the state's highway needs.

The highway department, of course, is highly appreciative of this assistance from the state's business interests. It plans to redouble its own educational efforts as opportunities arise.

Need Active Support

"Passive support is not enough," General Anderson declares. "Until the people of Virginia realize this Interstate system is the best thing that has happened to the Commonwealth since John Smith landed at Jamestown, we are going to have to expect misunderstanding and opposition."

A few weeks ago, the first stretches of Interstate highway were programmed. Plans for some 19 projects totalling 282 miles were announced. The ten public hearings held as required by the federal-aid law are only the beginning. The completed 1,012 miles of Interstate system routes will cross the state twice from north to south and twice (although in shorter mileage) from east to west. Thousands of inhabi-

(Continued on page 116)

FOR CONSTRUCTION EQUIPMENT ENGINES . . .

*Better to Start with —
Best in the Long Run!*

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MAGNETOS**



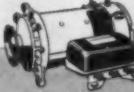
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On all your present equipment you can have this instantaneous spark efficiency and matchless dependability at all engine operating speeds and loads. For, there's an American Bosch Magneto replacement precisely engineered for all spark-ignited engines—in dozers, gas-engine driven compressors, pumps, graders, paving machines and spreaders. Moreover, American Bosch can serve you well at your job-site, through one of the largest and most efficient field service organizations. There's an AB Service Agency near you. Write to us today for Magneto replacement application data on your construction equipment engines. American Bosch, Springfield 7, Mass. A Division of American Bosch Arma Corporation.

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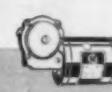
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Diesel Fuel
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ROADS AND STREETS, June, 1957



There's been a World of Change

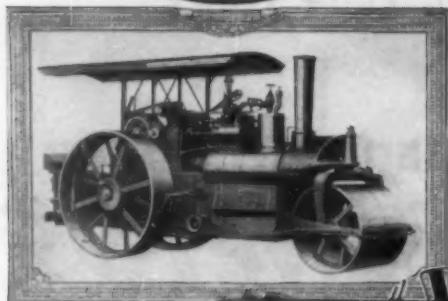
Highway building methods and procedures have made tremendous strides over the past 50 years. GALION is proud to have been an important part of this half century of highway progress.

With our new GRADE-O-MATIC Graders and ROLL-O-MATIC Rollers—and the outstanding service facilities of our Distributors—we are ready to help you meet tomorrow's even greater challenge.

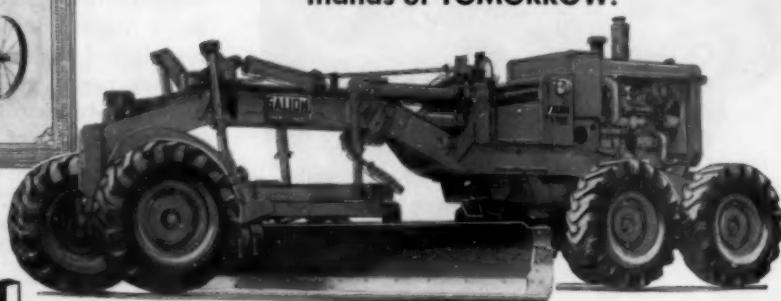
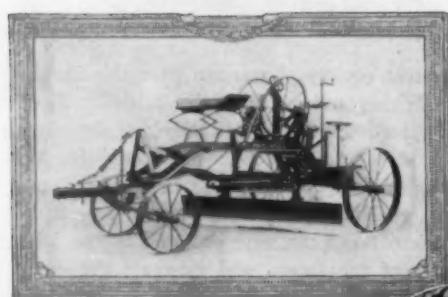
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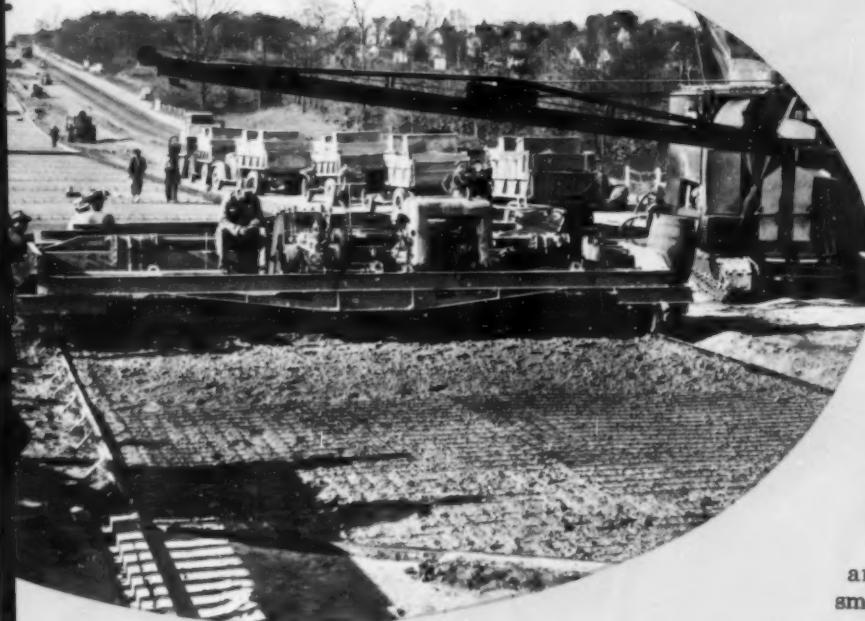
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... for more details circle 278, page 16

ROADS AND STREETS, June, 1957

highways last longer when reinforced . . .

with **CLINTON**
WELDED
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FABRIC



Clinton Welded Wire Fabric is unmatched as the backbone of well designed highways. Embedded in concrete or asphaltic concrete, Clinton Welded Wire Fabric imparts the positive mechanical anchorage needed to obtain even load distribution, control cracking, and minimize the deteriorating effect of temperature and moisture variations . . . assures smooth and long-lasting highways.

Clinton Welded Wire Fabric is available in a wide variety of gauges and spacings for all reinforcing requirements. It meets all A.S.T.M. and A.A.S.H.O. specifications.



WHEN THEY ASK
"is it Reinforced?"
SAY YES . . . WITH

CLINTON WELDED WIRE FABRIC
THE COLORADO FUEL AND IRON CORPORATION • DENVER • OAKLAND • NEW YORK



concrete pipes, like highways, last longer when reinforced...
with

CLINTON WELDED WIRE FABRIC...

Welded Wire Reinforcement in concrete pipe means strength to withstand internal pressure and concentrated external loads... minimizes deterioration and controls cracking. With Clinton Welded Wire Fabric, every joint is securely welded to assure firm anchorage and provide a bond of steel and concrete that makes pipe tough and durable.

Clinton Welded Wire Fabric conforms to all A.S.T.M. specifications and is available in a complete range of gauges and mesh sizes. So whenever you need concrete pipe—it will pay you to specify pipe that's reinforced with Clinton Welded Wire Fabric.

WHEN THEY ASK
"is it Reinforced"
SAY YES... WITH

CLINTON
WELDED WIRE FABRIC
THE COLORADO FUEL AND IRON CORPORATION

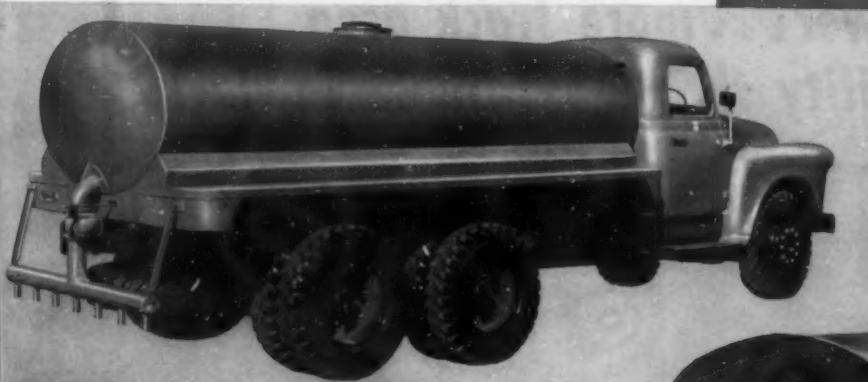


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*that can
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COLUMBIAN SPRINKLER TANKS are exceptionally well balanced—most important for rough going—and correctly designed with all necessary baffles.

Above, left. **COLUMBIAN** 3,000 gallon Gravity Discharge Water Sprinkler with remote cab control. Available in almost any capacity with front, rear, under-tank or combination sprinklers. This unit is mounted on tandem axle truck chassis. Also available with pump for filling from any outside source.

Above, right. **COLUMBIAN** Self-Loading Pump Pressure Water Sprinkler with remote cab control. Piping arrangement with four-way valve provides for pressure discharge through sprinkler bar and for pump-filling of tank from any outside source. Shown above 1,500 gallon tank on single axle truck. Any desired capacity available.

COLUMBIAN single or multiple compartment Mobile Fuel Tank for diesel fuel, gasoline or other fuel requirements at spot locations. Mounted on a 4-wheel wagon, this "mobile service station" for cars, tractors and trucks saves time and mileage. If you must buy your own on-the-job fuel storage, you'll find it pays to specify Columbian. Available in stock sizes from 600 to 2,000 gallons, or larger on order.



COLUMBIAN Asphalt transport. 6,000 gallon Semi-trailer illustrated hauls asphalt at 400°. Temperature is maintained with thick Fiberglas insulation, burner tubes and oil burners. Slip-jointed outer jacket prevents buckling by allowing for expansion and contraction.



Only well-designed, strongly built, securely welded tank equipment like Columbian is tough enough to take the rough going of highway building. Columbian tank equipment like that shown here, has the reputation for outlasting three truck chassis. Columbian has more than half a century of mobile tank-building experience. Today's Columbian equipment is master-crafted by skilled tank men using the latest welding techniques, under rigid Columbian quality control.

For any tank equipment you may need in highway construction or maintenance, it pays to specify Columbian. Our engineers will be glad to help you work out your gross weight limitations and will design equipment to fit truck sizes of your selection.

For any Tank-Type equipment, call Columbian. Our engineers will be glad to figure on your specific requirements. There is no obligation on your part.



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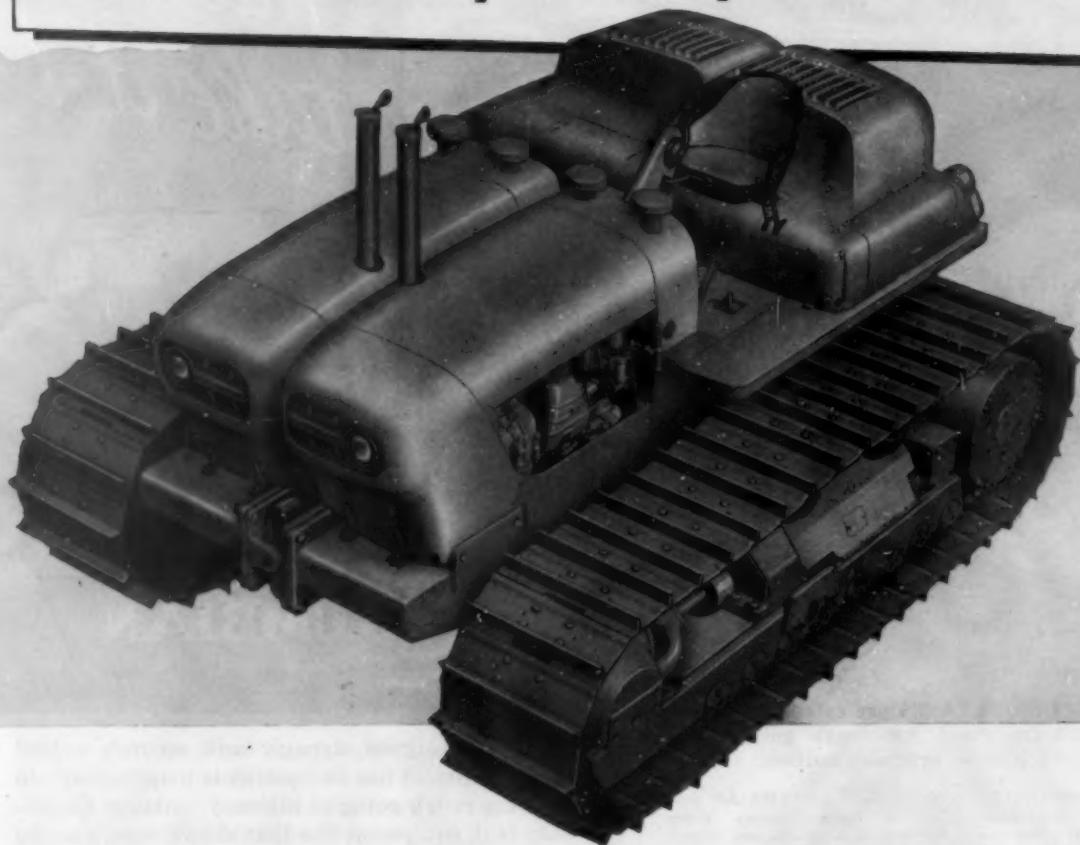
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for more details circle 356, page 16

STEEL, Master-Crafted by Columbian...First for Lasting Strength

NOW THE Euclid TC-12 GIVES YOU

**more horsepower... more track area...
more accessibility than any other crawler!**



Ever since it was introduced more than a year and a half ago, the Euclid TC-12 Tractor has set completely new standards of crawler production and performance. It has proved, on job after job, that it is years ahead of the field in ability to do more work—faster, easier and cheaper. Now the TC-12 has even more power to handle the biggest tractor jobs.

Powered by two 218 h.p. engines with separate Torqmatic Drives for each track, there's a total of 436 horsepower. Big 27" standard shoes and

8 track rollers give good balance with the additional horsepower, heavy duty dozer blades and other attachments.

This new TC-12 Crawler has many other improvements that put it even further ahead of other tractors . . . in performance, ease of operation, maneuverability and service accessibility. Ask your Euclid dealer to prove that the TC-12 has no equal for big tractor jobs and have him show you why **Euclids are your best investment.**

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



20% MORE WORK-ABILITY



Euclid "Twins"—the TC-12 Tractor and Twin-Power Scraper—will move the cheapest dirt on the big road program or on any earthmoving job. They can set new production records at lower cost on your operations.

The Euclid TC-12 has exceptional maneuverability because each track has a separate power train. Operator has excellent visibility and "hair trigger" control of steering in any of the three speed ranges, forward or reverse.



With separate Torqmatic Drive for each big track, the TC-12 is fast on its feet, with plenty of power and traction for any big tractor job. It has proved its ability to outwork any other tractor on dozing, clearing, push-loading scrapers and pulling big equipment.



A high production machine, the TC-12 is easy to operate—delivers more push-pull drawbar horsepower at high travel speeds. Utilized assemblies and easy accessibility of major components permit servicing without major tear-down of other parts.



For push-loading big scrapers the Twin-Power "Eve" crawler has no equal. Torqmatic Drive provides a smooth, steady flow of power—changes from one speed range to another and from forward to reverse are made under full power.



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THE EFFICIENCY OF YOUR

ROADS AND STREETS, June, 1957



— COST "CUTTERS" —

Claims of efficiency mean nothing unless backed up by actual cases. The Fruehauf roadbuilding Trailers shown here are saving real money for their owners! Here are the *facts* in black and white.

Elmer Burger, driver-owner hauling sand and gravel for contractor Walter Morrell, Redford, Michigan, has cut equipment costs by hauling 40,000 pounds of payload per trip in one Fruehauf Cable Dump Semi-Trailer — previously a load requiring a combination dump truck and 4-wheel Trailer.

The Geo. F. Alger Co., Detroit, has speeded up cement delivery to a matter of 27 minutes for 170 barrels, and reduced manpower needed from 4 to 1, with Fruehauf Twin-Screw Bulk Commodity Tanks.

The Elmer C. Breuer Company of Cleveland hauls steel — one of the toughest kinds of loads — at the rate of a million tons per year, on Fruehauf Platform Trailers — and finds they operate longer for less, especially in the vital matter of tandem tire mileage.

These are the kind of savings you can put in your pocket.

FRUEHAUF FLEET IS PART OF YOUR ROADBUILDING PROFIT!

... for more details circle 358, page 16

ROADS AND STREETS, June, 1957

Typical Advance Meeting Publicity

PUBLIC SERVICE SPOT ANNOUNCEMENT

OCTOBER 22, 1956

STATE AND FEDERAL HIGHWAY OFFICIALS WILL SPEAK TO SMITH COUNTY CITIZENS ON THE FEDERAL HIGHWAY PROGRAM AT HOTEL LINCOLN TONIGHT AT SEVEN O'CLOCK AND TOMORROW NIGHT AT 6:30.

ROUTE 11 IS ONE OF THE HIGHWAYS TO BE IMPROVED UNDER THE PLAN, WHICH CALLS FOR THE LARGEST CONSTRUCTION PROJECT IN THE PEACETIME HISTORY OF THE WORLD.

SPEAKERS AT THESE MEETINGS WILL INCLUDE JOHN F. SULLIVAN, RICHMOND, VIRGINIA DISTRICT ENGINEER, U. S. BUREAU OF PUBLIC ROADS; H. H. HARRIS, RICHMOND, ASSISTANT CHIEF ENGINEER, VIRGINIA DEPARTMENT OF HIGHWAYS; AND J. MONTGOMERY FARRAR, RICHMOND, PUBLIC INFORMATION REPRESENTATIVE OF PORTLAND CEMENT ASSOCIATION IN VIRGINIA.

ANYONE INTERESTED IS INVITED TO THIS MEETING. THE ONLY COST WILL BE FOR THE MEAL. IF YOU PLAN TO ATTEND THE MEETING TONIGHT YOU MAY CALL THE CHAMBER OF COMMERCE AT PHONE NO. 2-8361 FOR RESERVATIONS. REMEMBER ... THERE WILL BE A MEETING TONIGHT AT SEVEN O'CLOCK AND TOMORROW NIGHT AT 6:30 AT HOTEL LINCOLN IN MARION.

- Advance publicity for the better roads meeting was usually developed by the local chamber of commerce or service club sponsoring the session. Here is a typical radio announcement for this purpose.

SELLING ROAD PROGRAM

(Continued from page 106)

tants will be affected directly and many more indirectly during the 13-year duration of the federal-state program. The department has become exceedingly public relations conscious.

"We are spending more than \$350,000 a day for better roads in Virginia," General Anderson points out. "Nothing is so important as having the public understand how we're spending that money."

Not long ago, all the division engineers were called into Richmond for special sessions on public education. They were asked to go back to the field and pass on their understanding of the problem to their resident engineers.

Backed by active supporters such as the state chamber of commerce

and its Better Roads committee, the Virginia highway department's public relations problem has become considerably simpler.

Thanks to the businessmen's enthusiastic endeavors to tell the story of Virginia's highway future, the state engineers are finding support as well as opposition at the public hearings. In fact, the hearings are providing unprecedented opportunities for the highway department to publicize its legitimate objectives and hopes.

Highway industry representation on the Better Roads Committee includes Archer B. Gay, engineer-director, Virginia Road Builders Association, vice-chairman; and J. J. Forrer and H. C. Hofheimer, materials producer representatives, as members. Gordon Maynard, district engineer of the Portland Cement Association, is chairman of a subcommittee on highway allocations.

Electronic Methods Being Tried by Missouri Engineers

Two test projects using electronics to compute final quantities on construction projects have been completed successfully, and the division of surveys and plans of the Missouri state highway commission has taken steps to test further the method in all districts.

The new test will come under a recommendation from C. P. Owens, division chief, that the electronic computer method be tried on at least one job in each district. The purpose is to further acquaint the individual districts, as well as the main office staff, with the methods and the problems involved in using the electronic computer on original design.

The division first began its experiment with electronic computations last fall, when W. D. Vanderslice took over the first stages of the work. Since that time he has supervised use of the method to compute final quantities on an Interstate route project in Pulaski county and earthwork quantities on original design on a U. S. route. The electronics computations are made at the IBM service bureau in St. Louis.

For the statewide test, each district will select a project, or portion of a project, 3 to 5 miles in length. The district will submit a grad line at least on a strip profile, along with necessary information used in designing a highway, except that plotted cross sections will not be required. Special instructions have been sent to each district on preparations they must make.

The information submitted then will be processed at the service bureau. Information obtained from the computer will then be returned to the district where it will be compared with the same information compiled there by conventional methods.

Emergency Mechanical Aid for N. Y. Thruway Patrons

The responsibility which turnpike officials have for the motoring public is evidenced by the applications publicly invited from garage operators to furnish emergency service along the Erie section of the New York Thruway now under construction.

Each garage given a contract would patrol about 20 miles of the expressway 24 hours per day to render emergency assistance to any patron whose vehicle is disabled.

How to put limestone and gumbo in their place



THIS is heavy going on a new section of four-lane U. S. 80 just east of Ranger, Texas. Collins Construction Co. of Austin put in 7.8 miles here and they handled 395,000 yards of material doing it. A lot of that was rock. And a lot was limestone and gumbo.

For this sort of heavy grading, Collins called in their CAT* No. 12 Motor Grader. "Finest all-around grader I ever saw," says veteran operator V. W. Nichols.

Notice that operator Nichols sits down to handle his No. 12, even in rough stretches like this. If an operator has to stand to see his work, he tires much quicker, no matter how good he is. The operator of a No. 12 enjoys the convenience of in-cab starting, too, and power steering, and the exclusive Caterpillar accelerator-decelerator. Most of all, he enjoys the assurance he's at the controls of a tough, reliable machine that's *built to do the hard work*.

Backbone of the No. 12 is the strongest frame in any motor grader now on the market. Special channels make it that way. Box section circles increase its durability, as do its box-type drawbars. And the engine is of the same hardy breed—clutch, transmission, final drive are built to take heavy motor grader service.

Other features help explain the No. 12's popularity with operators and owners, too. Fast, accurate mechanical controls. Anti-creep brakes. Blade maneuverability that lets you swing from ditch cut to bank cut in less than a minute without adjusting links. Your Caterpillar Dealer will give you full details—and a demonstration, any time. He's ready with expert service, also—and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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Mr. Highway

(Reprinted from *Roads and Streets*, May, 1953. Mr. MacDonald died April 7, 1957. See news item on page 38.)

To many of us in highway work it is hard to realize that a fellow named MacDonald is no longer guiding the helm in Washington. Thomas H. MacDonald has retired at age 72 after serving 34 years, first as chief, then as commissioner of the Bureau of Public Roads. His many friends wish him well as he departs. His immediate address is College Station, Texas, where he is a consultant on a research institute being set up by Texas A. & M. College.

MacDonald is certainly the No. 1 highway engineering figure of our times. Few men in contemporary public life have left greater tangible monuments, few have left a greater impress on the nation's economic and social life.

Shortly before leaving Washington, the commissioner extemporized for Roads and Streets on some of the problems he considers most vital to the future of highways. In this informal interview he referred to one of the themes of his Centennial address in Chicago last September. "The highway engineer's problem," he reiterated, "is that he be permitted to accomplish the things he knows how to do. Before he can plan or build better highways, legislators must provide the administrative machinery and the source of funds."

Engineer's Chief Problem

Here, briefly stated, is a secret of MacDonald's rather astonishing career. Throughout his public life he sought—and obtained—the confidence and cooperation of legislative bodies. His early success as a leader in Iowa highway affairs brought him to Washington where he won the respect of Congressional leaders. His counsel has helped establish and maintain the sound, far-seeing federal-state relationship under which the nation has emerged from mud road days to the present relatively advanced state of highway network development.

"A legislative body has a permanent existence," he emphasized. "Individual members come and go but these bodies remain. It is important

to highway advancement that the legislatures have a continuing rather than sporadic interest in highway affairs. Highway administrators, hence, must maintain a continuous, fixed purpose of supplying full information on highway needs to their law makers."

Under MacDonald's guidance the Bureau of Public Roads has set an example by providing facts to the Congress. This has been done with such success that Washington leaders came to look to him for straight answers and more often than not acted on his well-tempered recommendations.

Often in Danger

Few of us realize how many times in the past three decades the federal aid highway program was in danger of being derailed by radicals, theorists, agents of selfish groups or well meaning blunderers. But the sound tenets of the federal aid acts of 1916 and 1921 have stayed on the books. Lest we forget, it was these acts which provided the first major federal appropriation on a state matching basis. It was these acts which encouraged the establishment of modern highway departments in the states, which fostered the defining of a main road system, and spurred the adoption of progressive design, construction and maintenance standards for federal aid routes.



Thomas H. MacDonald

It was then, too, that the principle of state control was established. MacDonald and the Bureau, as a policy, have avoided excessive federal encroachment on state highway affairs. The Bureau is conspicuous for an almost complete absence of federal specifications, be it noted; it has worked through committees of the American Association of State Highway Officials to set up engineering guides.

The present high activity in toll roads and bridges the retiring commissioner sees as but a phase in the struggle to fit highway transportation into modern life. The toll mileage will always be but a minor part of the entire road network, and toll roads will have little effect on the long-range development of this network, "except possibly to retard legislation desirable for proceeding with the whole road problem," to quote his words. "Patterns in automobile use have changed little in the past quarter-century. While there are more cars, more freely used, the auto still is basically a local vehicle, used daily in the movement of people."

The long-distance utilization of highways is centering chiefly in the mushrooming truck transportation, observed MacDonald. He voiced the hope that sound balance will eventually be achieved between rail and highway transport. Railroad companies he said, must remain in strong economic health for the movement of the nation's heavy long-distance freight.

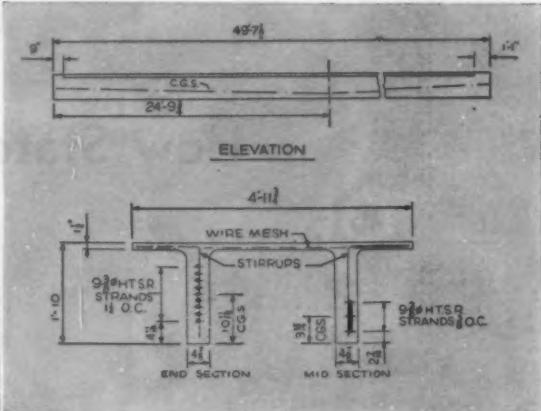
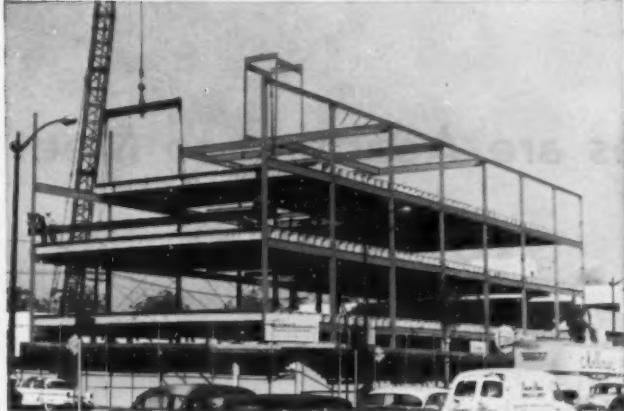
The Human Side

Perhaps closest to MacDonald's heart as he leaves Washington is the human side of highway engineering. The Bureau began its federal aid work a third of a century ago with a group of able young engineers, many of whom have stayed on to make good careers. "From the start," he reminisced, "we had some kind of a training program. Deputy Commissioner Fairbank, for example, was the first trainee, coming fresh from Cornell to achieve a distinguished career. The Bureau has had few leaders who didn't come in through the training route and work their way up." The present more formalized training program has also been successful.

"Mr. Highway," as the commissioner came to be known, left as his legacy an example of leadership, personal integrity and adherence to sound principles. His successor indeed has big shoes to fill.

Prestressed concrete floor members with deflected strands were used in this Beverly Hills, California, 4-story office building. Steel plates cast in the concrete members were welded to the steel frame, so that the floor system serves as a diaphragm to stiffen the entire structure.

Each double-tee floor section is five feet wide x 22 in. deep and prestressed with 18 Roebling $\frac{3}{8}$ in. diameter 7-wire uncoated stress-relieved prestressed concrete strands. A 2 in. poured-in-place slab on top of the precast section completes the structure. The 49-foot span is designed for 50 pounds per sq ft live load, plus 20 pounds per sq ft for walls and partitions.



Architects and Engineers
Cejay Parsons and Jack H. MacDonald

General Contractor
Jack H. MacDonald Co., Inc.

Prestressed Concrete Double-Tee Floor Sections
fabricated by
Rockwin Prestressed Concrete Corporation
Norwalk, California

Deflected Strands Increase Scope of Precast Prestressed Concrete

New technique permits longer spans with shallower and lighter beams; opens new areas for application of modern construction medium

Recently developed methods have added new impetus to the rapidly increasing use of precast pretensioned bonded prestressed concrete.

One of the most important of these new developments is deflection of the strands. This substantially increases the strength and bending resistance of a member without increasing its size.

A typical example is the 49 ft $7\frac{1}{2}$ in. span floor system in the building illustrated above, using double-tee beams only 22 in. deep. Units for this span and load would have had to be much deeper and heavier if the prestressed strands were not deflected.

For data on tensioning elements and general information on prestressed concrete, write Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Consult Roebling First... First in the U.S. with prestressing and tensioning elements

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... for more details circle 320, page 16

ROADS AND STREETS, June, 1957

Highway Bridge Practice:

How States are Adapting to Meet

Roads and Streets Staff Review

Under spur of the recent material delays (now easing), the need to stretch engineering manpower, and development of new techniques and refinements, state highway departments are actively revamping many of their bridge designs and procedures. Presented here are notes and quotes from letter replies received from state highway bridge engineers.

DURING and following last year's steel strike, our department has made an effort to cut down on the use of steel wherever possible and is substituting concrete design. But we have found that we are not able to get along without a considerable amount of structural steel, especially on our longer spans."

So reports J. A. Williams, bridge engineer of the Missouri state highway commission, in a reply to a query addressed to state highway bridge engineers on current bridge trends by the editors of Roads and Streets. Williams was one of several state bridge chiefs who similarly gave a picture of "balanced

thinking" in this time of delayed steel delivery.

Another spokesman, L. P. Carlson, bridge design engineer, Arkansas, replied: "We have not gone 'all out' for alternate designs, hoping that the steel situation would ease and that the cheapest types of construction could prevail."

Arkansas is in a relatively favorable area as to competition between steel fabricators, noted the Arkansas engineer, who said that, should the situation change and reinforced concrete or prestressed or precast members prove more economical at any time, the department will of course use them.

These replies are singled out here as being repre-

- Precast, prestressed concrete being used increasingly—but recent shortening of delivery delay has improved steel's competitive position.
- Welded beam and girder assemblies are widely used by one state to meet shortage of rolled wide-flange beams.
- A number of states have sidestepped the H-pile shortage by substitute designs.
- Despite delivery delay some engineers are adhering to steel beam spans wherever economical.

- Most states have gone far in standardizing on small bridge plans, aided by the standards issued by the Bureau.
- The "electronic" revolution in the design room has barely begun, but will bring swift changes in location and design studies, stress computation, quantity estimates.
- Despite the engineer shortage, the states will be able to achieve the necessary tripling of their bridge design and construction load.
- Consultant firms will play an important role for small structures as well as large.

Material Shortages

sentative of the wide range of thinking today in substitution of new designs to avoid long-delivery steel. The replies reviewed here, it should be noted, were written for the most part during the past mid-winter period. The slowing down of some types of industry in recent weeks has somewhat improved the steel supply picture, although many contractors are still taking, or at work on, jobs which entail a wait of many months for steel.

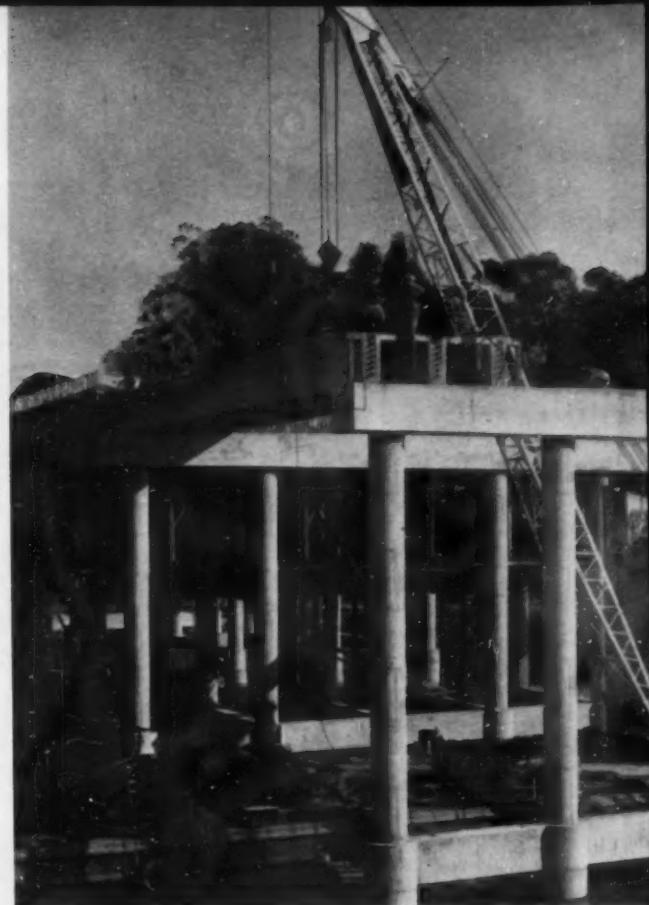
Representative of a state which has gone over—but by no means all the way—to concrete is Illinois. "Since the steel situation became critical in 1955," notes bridge engineer V. M. Romine, "we have concentrated on avoidance of the use of structural steel in design wherever possible. However in many situations we have found it impracticable, uneconomical or impossible to substitute concrete, either reinforced or prestressed, for structural steel. Also, we have many designs completed in steel which we do not consider desirable to scrap or redesign."

No Move Economical

In discussing the economics of the question, Romine reports that prestressed designs for spans between 40 and 80 ft. are currently no more economical than steel designs. "But perhaps more competition in the prestressed concrete field will change the situation," he added. The Illinois state road work recently has included more than 50 I-beam designs, and 275 prestressed structures are planned for the Illinois toll road.

Prestressed concrete has made its biggest gain in Illinois for widening existing bridge decks. About fifty such jobs were designed in the past year, involving spans from 35 to 55 ft. Also for smaller spans (15 to 30 ft.) in secondary roads, precast channel type slabs have been used extensively and "found both satisfactory and economical." Conventional poured slabs are used for shorter spans on the primary system.

Many of the engineers have been marking time in recent months, awaiting the report of the AASHO sub-committee on bridges, which has been



• Setting precast prestressed girders for new highway bridge across Richardson bay on the Redwood highway in Marion county, California. An example of construction made economic by the availability of contractors with casting yard facilities and prestressing experience. Photo: A. L. Elliott, bridge engineer—planning, California Division of Highways.

engaged in developing several standard I-type, prestressed, precast standard beam designs. Some of the comments:

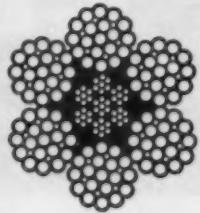
(Virginia) — "Using prestressed concrete on a limited but constantly increasing scale and expect to have standard plans for many precast members by this spring." — from bridge engineer J. N. Clary, who noted the basic problem of the longer spans required for today's expressway grade separation and the long spans for other structures, where design for concrete is least feasible and where the wait period for unusually long, heavy rolled beams is longest.

(Iowa) — "Concrete being used almost exclusively in our current design. We have developed standard designs for prestressed beams, both pretensioned (30 to 67½ ft.) and post-tensioned (50 to 80 ft.) spans." As reported by Neil Welden, bridge engineer, Iowa is currently designing a 280-ft., 3-span continuous concrete box girder, and contemplates a similar structure 240 ft. long. "Our experience indicates that concrete bridges compare favorably

(Continued on page 123)



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LOOK FOR THE YELLOW TRIANGLE

5078

... for more details circle 268, page 16
ROADS AND STREETS, June, 1957

ADAPTING TO SHORTAGES

(Continued from page 121)

with steel in cost, and we believe that we can eliminate a large amount of the requirement for steel."

(New York) — Due to the steel shortage recently, the department of public works has been using pre-cast and prestressed members "to a considerable extent," according to deputy chief engineer C. F. Blanchard, who referred to the recent long delays suffered by contractors and its effect on project cost. New York is considering a further step in the use of post-tensioned members for longer spans.

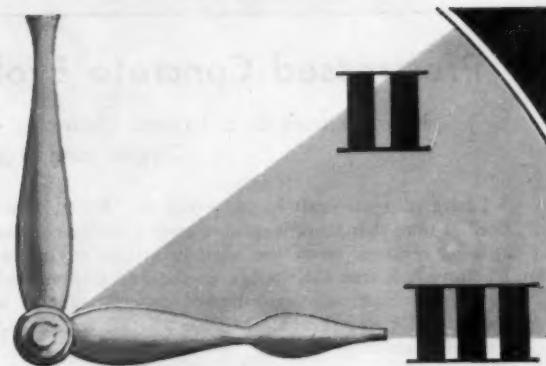
(North Dakota) — The department has exploited every possible type of design in attempting to meet materials shortages, reports chief engineer M. P. Wynkoop. A design has been developed for a continuous reinforced concrete slab bridge which can in some instances replace steel. Also being developed are concrete T-beam designs and standard plans for post-tensioned concrete beams, to be used in places where steel has heretofore been specified.

"Where the spans and the location require the use of steel beams," said Wynkoop, "we are entering into the composite type design. The purpose is not to reduce cost but steel tonnage . . . We have not advanced far enough in the program to determine for sure whether we are on the right track."

Post-tensioned Bridges

(Kentucky) — This department has made special plans for post-tensioned concrete bridges and expects to build three or four such structures on the Watterson expressway at Louisville during 1957, involving spans 70 to 100 ft. According to bridge engineer E. D. Smith, Kentucky doesn't need at this time to go to pre-tensioned short-span design—a sentiment in line with that expressed by several other bridge engineers at the AASHO's bridge committee meeting held at Atlantic City last November, representing in many instances states which have not as yet developed a flourishing market for commercial casting yards.

(Michigan) — "The policy for several years has been to avoid the shapes we know are hardest to obtain," states R. H. Puffer, bridge engineer in Michigan. "We are presently designing many structures



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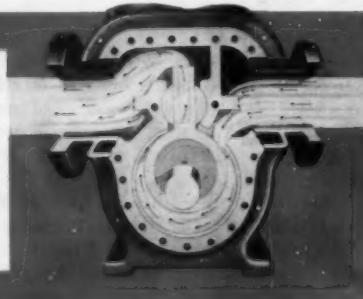
Once you accept Time as the priceless commodity it is, the KINNEY Rotary Plunger Pump becomes a most important dollar-saving piece of equipment. An attractive price tag may be a big temptation when buying an asphalt Pump. But, any price advantage will disappear in a hurry in the face of hours lost waiting for asphalt to heat up to a pumpable consistency. Now—add the cost of down-time for extra cleaning and repairs . . . the man-hours and machine production lost because of a cheap Pump—and it's evident that TIME buys you more with a



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Prestressed Concrete Evolving Rapidly as Bridge Type

By letter from G. S. Paxson, Chairman, AASHO Committee on Bridges and Structures, Oregon State Highway Department, Salem

I have read the draft of the article on "Bridge Practice." I note that there is quite a wide variation in the answers received from the various bridge engineers. I believe it is true that bridge engineers are interested in the development of prestressed concrete—not as a substitute for structural steel but as another competing type of structure.

While progress may seem a little slow in the universal acceptance of prestressed concrete as a competitive type, we must remember that it has been only a decade since the first highway structure of this type was built in the United States. In reality progress has, I believe, been rapid.

The first use of prestressed concrete, at least in any great volume, was in the fairly long span post-tensioned type. This was first developed in the use of individual girders with a concrete deck of conventional concrete. The last few years the use of pre-stressing has spread to box girders in which the entire superstructure is prestressed. Where conditions are

favorable, both of these post-tensioned types have proved themselves to be competitive.

Recently pretensioning of girders has become quite common in some sections of the country. Pretensioning, because of the major investment required, necessitates a considerable volume in order to be economical and is best done by commercial producers who can use their plant investment for the manufacturing of building units as well as bridge girders. Some day we hope that these girders can be manufactured and sold as standard articles, in the same manner as we now purchase structural steel. The question of inspection and acceptance of such members is the principal stumbling block at the present time. The high cost of forms for a large pretensioning installation makes it very desirable to have standard sizes and sections so that these forms can be used over and over again.

The Bridge committee of the AASHO is working with the Prestressed Concrete Institute in the development of such standard sections and the matter will be before the committee at its meetings this summer.

in reinforced concrete and using prestressed, precast decks in a number of cases where falsework for cast-in-place construction would be objectionable." Michigan is one of the states which have delayed further work on new standards for prestressed construction, until the AASHO committee report is out. Currently reinforced concrete is being used for about 75 percent of the bridges, most of which are 3 or 4 span continuous.

Steel on Order

Structural steel where specified in recent projects has been ordered on the basis of preliminary plans thus having the steel on order during the period while final plans are being developed.

(Mississippi) — This department has changed practically all its bridge designs to concrete during the past year. Interest in prestressed designs was heightened by sending representatives to Florida to inspect pre-stressing yards, and also to attend the pre-stressing conference in St. Petersburg in October, 1955.

As reported by bridge engineer George L. Lemon, the staff is also studying the hollow box girder type, as developed in California and Alabama. For smaller spans (20 to 25 ft.), trestle slabs are of flat-slab design. For spans 30 to 40 ft., prestressed design with composite

poured-in-place slab is used. Grade separation structures for Interstate work are going to the hollow box type, for spans 67-46-67 or 46-67-67-46 ft., depending on whether the expressway passes over or under the crossroad.

(Missouri) — As further reported by bridge engineer J. A. Williams, deck design for precast concrete includes a channel section for spans up to 35 ft. for H-15 loading and to 40 ft. for H-10 loading on secondary projects. A continuous concrete slab design using Sonovoid tubes to reduce dead load, has been found satisfactory for spans up to 72 ft. on Interstate and primary road jobs. This state also held back on prestressed design, pending the AASHO committee's report.

(Nebraska) — Has designed several long structures as continuous concrete box girders and has substituted concrete girders or prestressed girders for some I-beam designs for shorter spans, according to G. C. Strobel, bridge engineer.

(New Jersey) — "Due to extreme delays in delivery of fabricated steel, we intend to use precast concrete members whenever they are suitable. This will practically eliminate structural steel for all ordinary bridge spans up to about 100 ft." — L. C. Peterson, director and chief bridge engineer.

(Ohio) — About one-half of the

600 small bridges placed under contract in the past two years are of steel, half of concrete. Most of the steel structures were of the continuous beam type, welded with maximum intermediate spans of 94 ft. Most concrete structures were of the continuous slab type, with maximum spans of 55 ft. No precasting or prestressing has as yet been initiated, according to D. H. Overman, engineer of bridges.

(Oregon) — Prestressed concrete and also concrete box girders will figure more strongly in Oregon's program, according to P. M. Stephenson, bridge engineer. "For the Interstate work we plan to let a considerable number of structures for one contract, especially where they are identical or only varied by a slight amount. This method reduces the field engineering."

Comparisons Made

(South Dakota) — "Multiple comparisons are always made in selecting the design type," said K. R. Scurr, bridge engineer. "The choice usually falls between short steel girder spans and reinforced concrete." In the recent situation this engineer considered it justified to give the concrete design the preference, even at the sacrifice of dollar economy. Until the recent easing of the steel shortage, the intention

(Continued on page 127)

MORE WORK-ABILITY WITH THESE NEW "Euc" REAR-DUMPS

for construction, mine,
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With overhung engine type tractors and full 90° hydraulic steering, these two new Euclid Rear-Dumps have excellent maneuverability for close quarter work and accurate spotting at loading and dumping areas. Big tires provide extra traction and flotation for soft fills and difficult hauls. The low over-all loading heights and rugged construction permit easy loading with all types of equipment. Smooth bodies with 3-stage, double-acting Euclid hoists assure quick shedding of loads.

Downtime and maintenance costs are held to a minimum as a result of the easy service accessibility of all major components. Interchangeability of the semi-trailer rear dump bodies with 7 and 18 yard scraper bowls provides extra flexibility for changing job requirements.

Your Euclid Dealer has detailed information on these versatile "Eucs" as well as other Rear and Bottom-Dump models, Scrapers and Crawler Tractors ... have him show you why **Euclids are your best investment.**

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THE **S-7**

REAR-DUMP

12 tons payload . . .
11 cu. yds. heaped . . .
143 h.p. . . .
18.00x25 tires . . . top speed
loaded of 26.5 mph . . .
Torqmatic Drive . . .
NoSpin differential.



AND THE **S-18**

REAR-DUMP

35 tons payload . . .
32 cu. yds heaped . . .
300 h.p. . . . 27.00 x 33 tires
Torqmatic Drive . . .
NoSpin differential.

... for more details circle 281, page 16



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



THOR PAVING BREAKERS

*Available in
30, 60, 70, 80-lb.
classes*



Your men will complete more work with less fatigue when they use Thor Paving Breakers, because Thor's smooth performance prevents power overloads which stagger the stroke and cause vibration. Thor's exclusive tubular air valve admits only the exact amount of air required for each stroke, assuring balanced power, maximum air economy and low maintenance costs. Ask your Thor distributor for a demonstration. Thor Power Tool Company, Prudential Plaza, Chicago 1, Illinois.

Thor model 25 paving breakers working in tandem, speed street demolition. Easy-operating latch retainer encourages operators to use sharp steels.



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... for more details circle 336, page 16

ROADS AND STREETS, June, 1957

ADAPTING TO SHORTAGES

(Continued from page 124)

was to substitute prestressed concrete girders for spans up to 85 ft. In its March 26 letting this spring, the South Dakota department, on assurance of 3-6 month delivery, restored steel to a purely economic choice and 2,000,000 lb. of structural shapes was included in six projects. "With ready supply of plate up to $\frac{3}{8}$ x 48 in. now assured," said Scurr, "plate girders are again highly competitive."

(Vermont) — This state has not adopted prestressing but is standardizing wherever possible on a composite I-beam and concrete deck section involving spans from 34 to 99 ft. and roadway widths from 30 to 42 ft.—A. D. Bishop, bridge engineer.

No Design Change

(Washington) — This state up to the present has not modified any designs to meet materials shortage. Rather, according to George Stevens, bridge engineer, extra time has been allowed for completion where necessary.

(West Virginia) — The road commission staff has been asked to analyze all structural design to limit use of steel, particularly steel shapes, as much as possible, reports George W. McAlpin, assistant chief engineer. This has resulted in the use of reinforced concrete and in many cases prestressed, precast members.

Standardization: So many of the states have long since adopted various standard designs that, at first glance, this element of the picture might not be deemed newsworthy. But much is still happening here.

The Bureau of Public Roads has just revised and brought up to date its suggested standard designs for small bridges—a timely and much appreciated piece of work.

Larger spans are being standardized today. The Pennsylvania department of highways, R. W. Arner, acting bridge engineer, has announced to the public that its engineers have taken a "far reaching 'step' in the simplification and standardization of its bridge designs. The effort has included (1) 13 drawing sheets which contain details suitable for virtually all bridges, and (2) a portfolio of 55 drawings covering all common types of standard structures. These are for spans from 20 to 80 ft. and various roadway widths. In most instances provision is made for a choice between alternate types, including prestressed construction. A saving of about 20 percent in bridge construction cost is expected from this effort, as well as the more rapid replacement of spans in emergencies.

An aspect of standardization which has been advocated, namely the exchange of standard plans between the various states, has not been met favorably in every quarter. K. R. Scurr, bridge engineer, South Dakota, comments, "It is doubtful if an exchange of plans between states (as suggested last winter by Mr. Volpe) will be of much practical advantage. Each state probably has a very complete file of its own non-skewed structures and structures of common skews.

"Interchange structures are usually so complex, involving grades, skews, vertical and horizontal curves and superelevations, that it is unlikely that a set of plans prepared by one state would be useful

Wisconsin's aim is to combine in one contract two or more small structures even though in different areas, as a means of construction economy and saving of field engineering.

to any other location either in that state or another state. Interchange structures also usually involve clearances of property and utilities that do not create a situation lending itself either to symmetry or standardization."

"The best field for standardization" Scurr suggests, "lies where a separation of a road over or under the Interstate system is involved without any requirement for an interchange. These plans can easily be standardized within the state and I do not believe that a state would want to introduce a heterogeneous group of structures along its highways which would have variable appearance and with which the bridge contractors would not be thoroughly familiar with respect to construction procedures and details."

New Set of Plans

Virginia's standardization, according to J. N. Clary of that state, includes "a new set of superstructure standard plans which when completed will range from 25 to 80 ft. The distinguishing feature of these new standards will be that the railing, curb or wheel guards, sidewalk (if required) and deck sections including roadway slab and beams will each be an independent standard so that by simple notes we may use these standards with different railings either without sidewalks or with one or two sidewalks as may be required. Several standards for expansion joints and bearing assemblies are also being prepared.

"We are also making use of reproduced tracings to a limited extent and anticipate soon to use such on a greatly expanded scale. We are also using to a limited extent standard plans for substructure units, both piers and abutments, and plan to expand such use greatly, using reproduced tracings to a considerable extent."

On piling practice, many of the comments partially reported in the above also included mention of changes in pile design. H-piles in

(Continued on page 154)

Steel Delivery Forecast: Some Better

Reports from national sources are indicating some improvement in the delivery schedules for steel products, including the heavy plates and structural shapes. First quarter output reached a high of about 96 percent of capacity, but analysts are predicting a yearly average output of 88 percent—or in terms of quantity—117 million tons. Second quarter capacity was forecast at 86 percent, third quarter at 82 percent and the fourth quarter at 87 percent.

There is one point in this situation which might prove somewhat troublesome, notes one contractor association leader. Prices are expected to rise again even in the face of a falling market. Total increases which confronted this past spring's bidders compared with last August, amounted to nearly \$10 per ton. Wages in the industry will rise again in July, forcing another increase of \$5 to \$6 per ton, minus any part of this which the construction industry decides to "absorb."

Special Steel Forms Designed for



1 After pouring the 60 degree invert, which is hand screeded, this form is used to pour the remainder of the invert, sidewalls of fresh air chamber and roadway slab.

Concrete Pumping . . .

Made History on

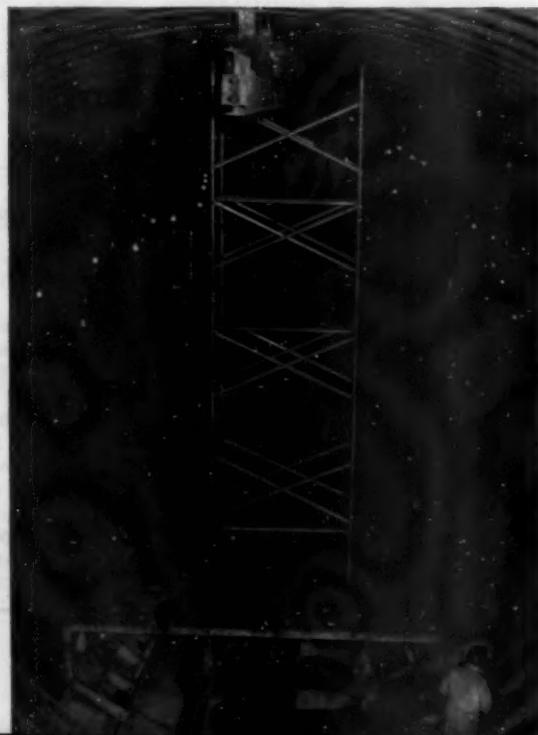
"It can be done better—" so the contractor calls in experts to talk it over . . . a top example of the inventiveness and cooperation that writes day-to-day history in American construction.

The third tube of New York's Lincoln tunnel, nearing completion at this writing, has been the scene of a new labor-saving method of handling arch pours with Pumpcrete, developed in conjunction with the contractors and other suppliers. Developed by joint contractors Mason-Johnson-MacLean, the method opens the way to faster tunnel construction.

The \$100 million artery will allow as many as 10 million more cars to pass between New York City and New Jersey annually, according to the Port of New York Authority.

Due to the great pressure involved, underwater vehicular tunnels of this type have always been constructed with a waffle-like, heavy primary lining made up of thick cast steel segments. While this type of lining affords maximum protection, there

2 Shown here is the top side of form pictured in photo No. 1.



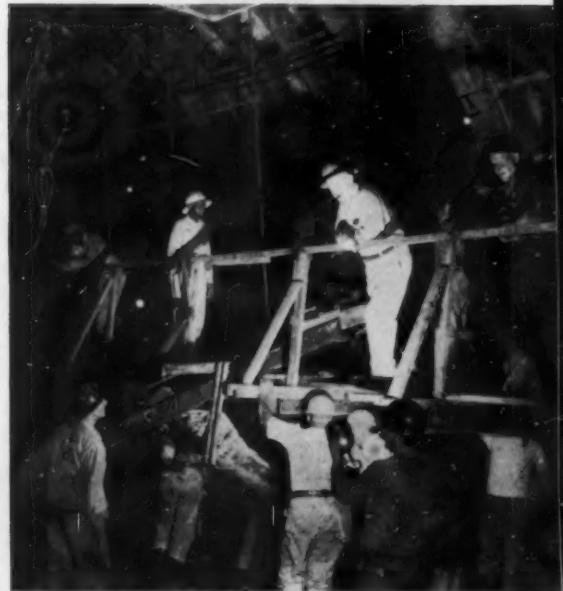


3 In background is lower sidewall form carried by its own jumbo; in foreground is special concreting carriage designed by Blaw-Knox; on the right are two Jaeger 4 1/2-yd. agitator cars pulled to concreting site by train.

Third Lincoln Tube

is never sufficient space available between the lining segments and the steel forms for a conventional slick pipe arrangement to be used for placing the concrete. Usually only 2 in. of clearance is available between the liner and form. Because of the waffle-like indentations in the primary liner, a lengthy process of drilling and grouting air pockets must be undertaken by the contractor to assure good concrete placement and construction of a sound arch.

On such New York tunnels as Brooklyn Battery and Queens Midtown, arches were formed by hand placing one form panel at a time. This panel had about one foot of contact surface. With the panel in place, concrete was hand shoveled behind it.



4 Pouring the roadway slab, agitators run from high line to gravity-pour concrete.

Needless to say, the operation was expensive and time-consuming.

For the third Lincoln bore the job management decided that much of this costly labor could be eliminated if the best experts were called in to take a new look at the methods of concreting tunnels. The contractors summoned forms and pump representatives to discuss pressures involved in pumping concrete into the arch enclosure rather than shoveling it; whether it would work; and how it should be tried.

Working on this basic idea, the Steel Forms department of Blaw-Knox Co. designed a set of arch forms with guillotine type valves inserted into the skin panels. These valves were fabricated from 8-in. pipe. A strike-off plate opens and closes them.

Because location of the guillotine was critical, Blaw-Knox designed the forms in panels of 5-ft. (Continued on page 137)



5 This traveler supports forms for the upper sidewalls.

ADAMS

built-in **GO-power** per dollar

You buy a grader for only one reason... **FOR PROFIT**. To earn top profit on your investment your grader should have a proven record of low maintenance costs and high work-capacity. Your modern Adams† motor grader has the stamina and **GO-power** to meet these essential qualities. Among its many built-in advantages, Adams offers you:

15 speeds to match power to load—
No other grader with standard transmission can match this flexibility in working speeds. Your operator easily adjusts power-to-speed-to-load to do more blade work than with any other grader of similar horsepower. Adams *works faster, reverses faster, travels faster...* offers you wider opportunity to match work-capacity to every type of grader operation.

You gain two ways: (1) Adams graders do more work in less time, and (2) with power matched to speed and load they stand up under heavy shocks, work steadily with less maintenance... less downtime. Watch an Adams grader at work. Ask an Adams owner. You will see why Adams 15 speeds alone can easily deliver top work-capacity per dollar invested.



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WISCONSIN: 150 hp Adams 660 levels fill and maintains haul-roads on State Highway 141, near Milwaukee, for Speedway Contracting. Big machine operates efficiently at speeds to 26 mph for maximum work-capacity and low operating cost.



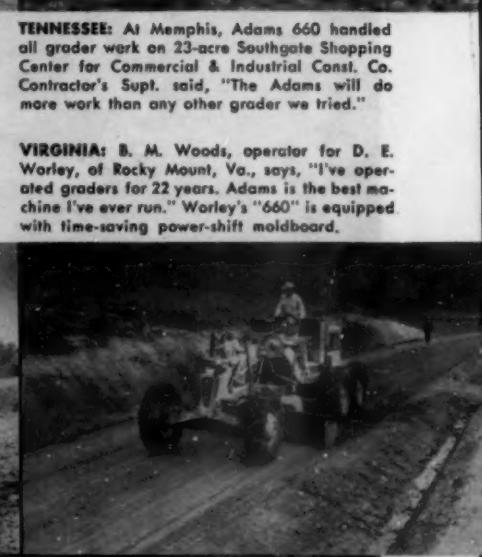
NEW YORK: Adams 440 handled fine-grading on Sunken Meadow Spur Parkway, Long Island, for Contractor Henry Hendrick. The grader's wide range of speeds make it possible for operator to complete work in shortest time.

INDIANA: Grading fill for 10' raise in constructing a section of Indiana Hy. 427, an Adams 660 (owned by Spears-Dehner, Inc.) spread an average of 4000 cu. yds. of heavy dirt per day—working in third gear (4.7 mph).



TENNESSEE: At Memphis, Adams 660 handled all grader work on 23-acre Southgate Shopping Center for Commercial & Industrial Const. Co. Contractor's Supt. said, "The Adams will do more work than any other grader we tried."

VIRGINIA: B. M. Woods, operator for D. E. Worley, of Rocky Mount, Va., says, "I've operated graders for 22 years. Adams is the best machine I've ever run." Worley's "660" is equipped with time-saving power-shift moldboard.





gives you more work-capacity invested

Constant-mesh transmission is a major reason why Adams has unequalled overall economy and high work-capacity. Designed especially for motor grader work, this rugged heavy-duty constant-mesh transmission gives highest efficiency under all operating conditions. Its precision-cut helical gears are crown-shaved for true mesh and quiet operation. Its gears and shafts are heat-treated to provide a wear-resistant surface that withstands shocks and abrasive action. Shafts and gears turn on anti-friction bearings. You will get longer, trouble-free service from your Adams transmission... which means greater work-capacity, greater earning power over the years.

Six ADAMS work-matched graders

Balanced weight distribution provides better traction, makes possible better use of power. Adams graders have been engineered with horsepower to match weight and working speeds. They give maximum traction and power throughout the entire work range.

Heavy-duty final drive is rigid and strong, to resist torsion and shock of rough going; housing is thick-walled; drive axle is full-floating; carries no grader weight. Driven axles are mounted in tapered roller bearings.

	POWER-Flow [†] 660	660	550	440	330	220
Engine hp	190	150	123	115	80	60
*Weight (lbs.)	30,200	30,050	26,370	24,080	23,020	15,500
Speeds	4 ranges	8 speeds	8 speeds	8 speeds	8 speeds	5 speeds
Forward (mph)	0.23 to 27.4	1.3 to 26.0	1.4 to 25.2	1.4 to 25.2	1.4 to 23.3	1.8 to 18.3
Additional range Opt. Creepers (mph)	(Not needed)	0.23 to 1.82	0.25 to 1.76	0.25 to 1.76	0.24 to 1.62	0.28 to 0.96
Reverse (mph)	0.22 to 24.4	1.1 to 13.7	1.2 to 13.2	1.2 to 13.2	1.1 to 12.2	2.5 to 3.2
Tires (std.) Front	14.00 x 24	14.00 x 24	13.00 x 24	13.00 x 24	12.00 x 24	10.00 x 24
Rear	14.00 x 24	14.00 x 24	13.00 x 24	13.00 x 24	12.00 x 24	10.00 x 24

*Usual working weight

†Optional



MONTANA: Adams grader builds canal embankments for the State Water Board. Contractor Chas. V. Sullivan, of Schye & Sullivan, says, "You can roll more dirt with Adams than with other graders in the same work range."



ILLINOIS: Burlington Roadbuilders, of Carthage, use Adams 660 to mix and spread surfacing on secondary roads. Says owner-contractor Lovett, "We do a lot of blade-mix work that you just can't do with other graders."



MICHIGAN: Blacktopping country roads, Contractor John Yerington uses 60 hp Adams 220 for road surfacing and light grading... uses his larger graders for heavy construction... figures he cuts machine expense 20 to 50%.

!Trademark



MEXICO: Contractor Zeus, S.A. of Mexico, D.F., uses 3 Adams 550 graders to help build a highway between La Paz and Santa Domingo. "We obtain correct grade and good service with Adams," says Engineer-in-Charge.



KANSAS: Along the Kansas Turnpike, Amis Construction Company, of Oklahoma City, worked Adams 150 hp 660 graders to level heavy fill, shape shoulders and banks, cut drainage ditches and maintain haul-roads.

For more evidence
of high work-capacity
per dollar invested,
see following pages

(continued)

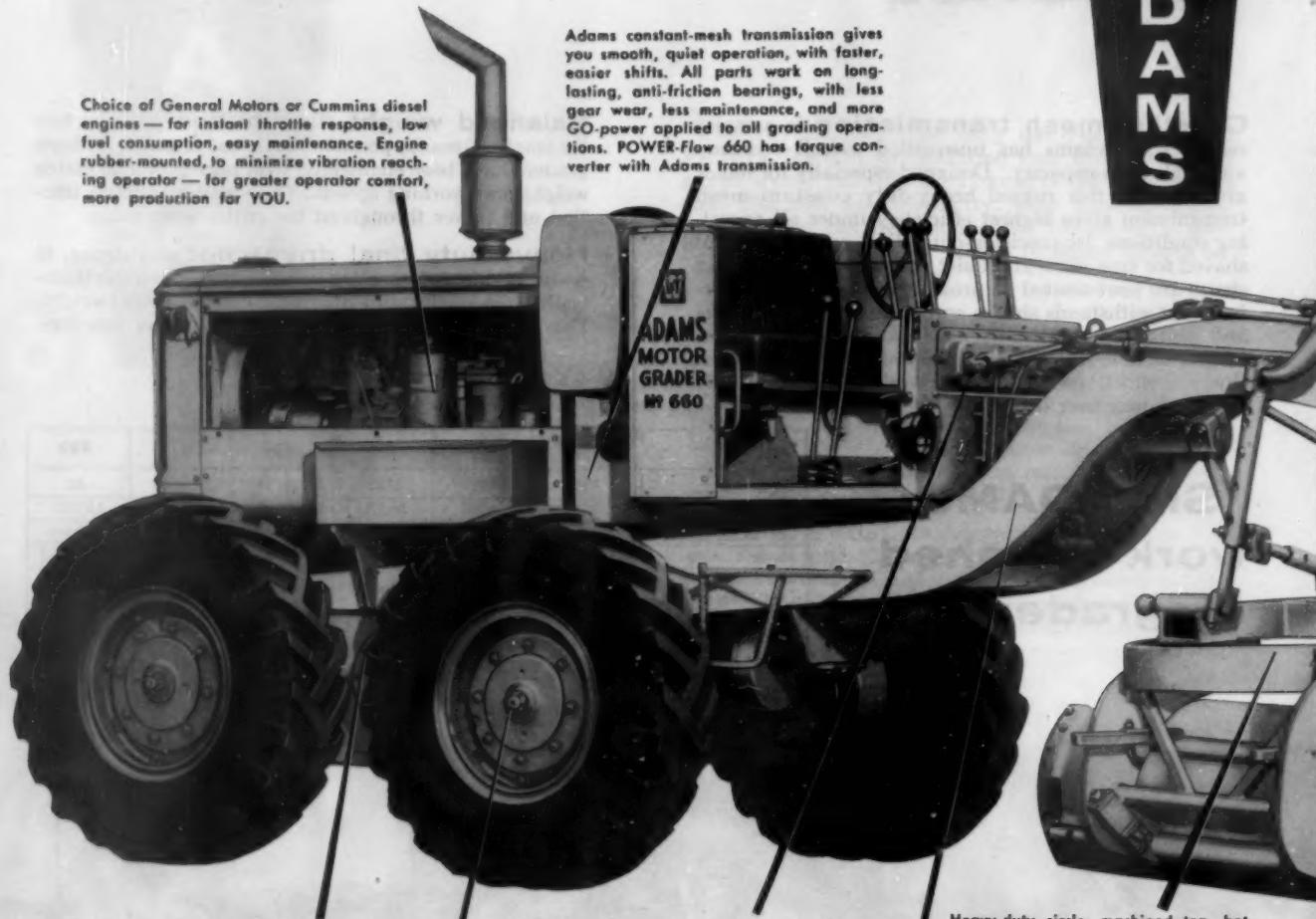
You get more work-capacity

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A
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Choice of General Motors or Cummins diesel engines — for instant throttle response, low fuel consumption, easy maintenance. Engine rubber-mounted, to minimize vibration reaching operator — for greater operator comfort, more production for YOU.

Adams constant-mesh transmission gives you smooth, quiet operation, with faster, easier shifts. All parts work on long-lasting, anti-friction bearings, with less gear wear, less maintenance, and more GO-power applied to all grading operations. POWER-Flow 660 has torque converter with Adams transmission.



Rear axle carries no weight, handles only power load. Heavy 2-piece housing carries the weight. Axle rides freely on anti-friction bearings, transmits maximum power to drive wheels for greater GO-power.

All operating control-box gears and shafts run on anti-friction bearings. All clutches slide on ball bearings. Control shaft universal joints have roller-bearings. Operator has instant, positive control at all times for greater accuracy.

Dual brakes — working on transmission as well as tandem-drive wheels — operate automatically at the touch of a convenient foot pedal. Operator is confident of quick, sure stops — feels free to use grader's GO-power in tight places.

Heavy-duty circle; machined top, bottom, and inside, for smooth, chatter-free operation. Strong T-shaped drawbar supports circle for accurate blading.

Box-type frame of heavy steel channel, continuous welded... end-to-end... to take all shocks and stresses of heavy grader work. Streamlined shape has no sharp bends or joints to weaken or break.



MASSACHUSETTS



MISSISSIPPI

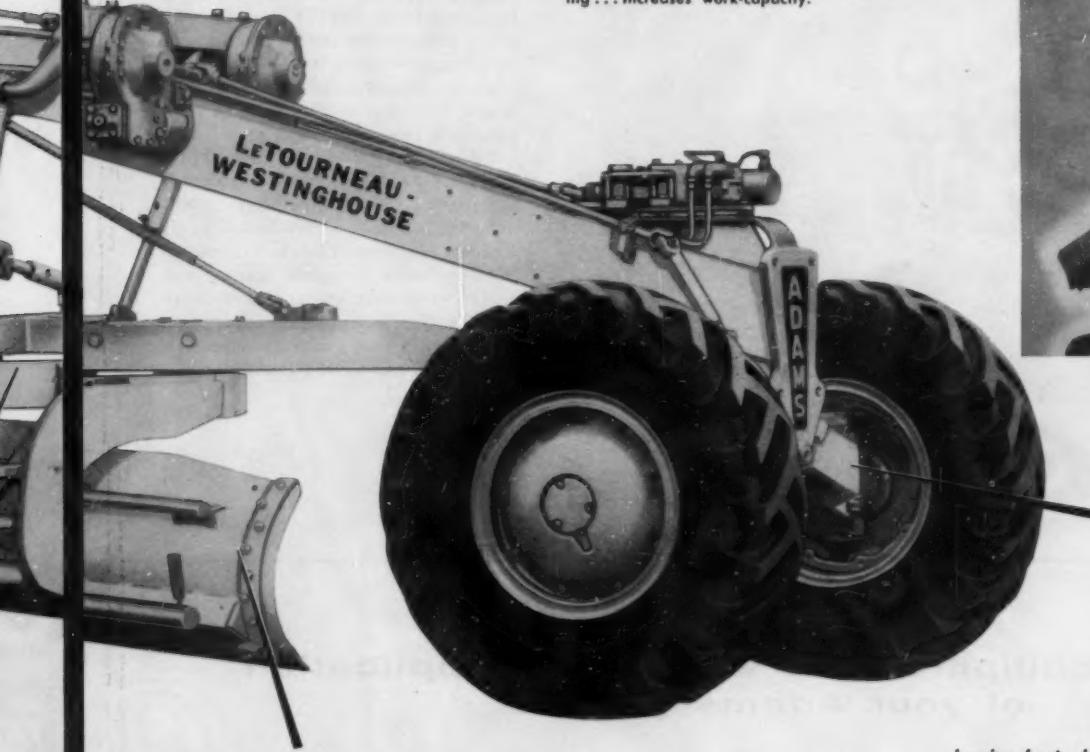


IOWA

per dollar invested... built-in **GO-power**

NOTE: You get all these modern advantages in Adamst Models 660, 550, 440, 330, and in the POWER-Flowt 660 which includes torque converter.

Operator has clear view ahead. With circle-lift controls mounted forward on high-arch frame, both ends of blade are clearly visible to operator, seated or standing. Assures more accurate grading...increases work-capacity.



Correctly-curved moldboard, held securely to circle legs, can be adjusted to tilt angle desired. Ample clearances permit full 360° turn of moldboard while machine is in motion...will not interfere with either front or rear tires.

High front axle straddles big windrows, gives 23" to 28" clearance, depending on tire size. Keeps axle from bulldozing windrow, with ample clearance when rolling sod, loose dirt, and oil-mix. Comes out of deep ditches without front axle dragging shoulders.

Leaning front wheels, pioneered by Adams, absorb side-thrust when blading heavy loads, cutting deep ditches and steep banks...make steering easier, permit shorter turns. Big front tires, standard on "660", available on all models for better flotation.

†Trademark



OKLAHOMA

NEW MEXICO

OREGON

TURN PAGE FOR MORE GO-power —

(continued)

The **BIG** and the **LITTLE** of Adams[†] work-capacity and bigger

BIG

190 hp
POWER-Flow[†]
660

For your extra heavy-duty work . . . cutting steep banks, spreading deep fill . . . Adams POWER-Flow 660 gives you maximum work-capacity at all speeds from 0.0 to 27.4 mph. This big grader applies 190 hp thru 3-to-1 torque converter to give you top work-power through an infinite number of power-speed ratios. POWER-Flow 660 works thru varying loads at constant speed . . . will not stall . . . starts extra-heavy loads without lagging. The LeTourneau-Westinghouse designed torque converter cushions engine and drive against shock . . . makes operation smooth and easy. For greater *GO-power*, get POWER-Flow 660.

Optional Equipment for wider work-application of your Adams grader



POWER-SHIFT MOLDBOARD

If your work calls for quick and frequent moldboard shifts—for extended reaches, or for working around obstructions—this power-shift moldboard will help you do better work at a big saving in time. Hydraulic power, controlled from the cab, shifts moldboard 26½ in. to right or left of center position in 10 seconds. Shifts can be made while grader is in motion. (Optional on all Adams graders.)



SCARIFIER

Strong, rigid V-type (straight-line on "220") scarifier used to break up blacktop and packed gravel road surfaces, and other materials too hard for grader blade to cut. Teeth are easily removed by lifting locking keys. Raising or lowering scarifier is done from cab. Grader blade can make full revolution without removing scarifier block. Scarifier is a "must" for most owners. (Available for all Adams graders.)

graders that give you more profits per dollar invested

60 hp Model 220

Use Adams 220 for your many utility jobs — maintenance, light ditching, banksloping, scarifying, fine-grading between forms, and other light-grading assignments. This releases your heavy-duty graders for more profitable production . . . increases the work-capacity of your operation. Adams 60 hp 220 works at 10 full-power speeds . . . leads its class with 5 forward, 1 reverse, and 4 optional creeper gears. Sturdy 4-wheel tandem-drive provides plenty of push-power for utility grading and ditching at minimum cost. The low price, and low maintenance of this hydraulically operated machine, make it a sound investment as a "second" grader to include in your equipment spread.



Select the grader best suited to your needs . . . from 6 Adams models ranging from 60 hp to 190 hp. ASK FOR A DEMONSTRATION . . . your nearby LeTourneau-Westinghouse Distributor will be glad to arrange it for you . . . no strings attached! Call him for complete facts and figures, or write the factory for full information.

†Trademark AG-1446-G

ELEGRADER

Elegrader plows and casts material, or loads into trucks. Side-casts 700 to 1500 cu. yds. per hr., loads into trucks at 400 to 800 cu. yds. per hr. A heavy-gauge disc-plow places material on belt conveyor which may be adjusted to load high trucks. Hinged conveyor folds for travel. Conveyor lengths: 17 $\frac{1}{2}$ ', 19', 20 $\frac{1}{2}$ ', 22', 23 $\frac{1}{2}$ ' and 25'; to 28 $\frac{1}{2}$ ' and 30' when used with tandem-wheel outrigger (pictured here). Elegrader is driven by PTO. (Available for Adams 660, 610, 550, 440, POWER-Flow 660 and Cat No. 12 graders.)



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 355, page 16

In actual road tests . . .



Dodge won top honors in test after test between comparable models of all three low-priced trucks. Special high-speed camera records actual finish of hill-climb test. From a standing start, test crews raced all three trucks up a 32% grade. Dodge was first by five lengths.

and on your job . . .



Dodge gives you more V-8 power, in every weight class, than either of the other two low-priced trucks. From 204-hp. pick-ups to 232-hp. tandems, the extra power you get in a Dodge means an on-the-job performance bonus for you. It means greater economy, too, because it cuts down engine strain, reduces wear and repairs.

Dodge Power Giants outpower, outperform the "other two" low-priced trucks by wide margin!

Want power? Dodge outpowers its low-priced competitors by as much as 27 percent.

Want economical performance? The advanced design of the Dodge short-stroke V-8 produces the most efficient fuel usage in the industry. You get more miles per gallon . . . full power on *regular gas*.

Want extra payload capacity and handling ease? Dodge has 'em beat on both counts.

How about it? Don't you think you should find out for yourself? Just give your Dodge dealer a ring. He'll bring a truck right to your door and he'll show you certified test results that demonstrate Dodge is a winner in actual tests and on your job.

DODGE

PowerGiants

MOST POWER OF THE LOW-PRICED 3

... for more details circle 260, page 16
ROADS AND STREETS, June, 1957

THIRD LINCOLN TUBE

(Continued from page 129)

4-in. lengths. This permits the contractor to change the locations of the guillotines without making any basic changes in the components of the forms.

To get the concrete up to the arch, the contractors have used a Rex 200 Double-Pumpcrete with a 3-*yd.* hopper. Blaw-Knox furnished a traveling carriage for holding the connecting lengths of concrete pipe. To make sure air-pockets didn't develop between the primary liner and forms as concrete was introduced, bleeder nipples were installed on the underside of the forms. In practice, as the grout begins to run out of the nipples, they are withdrawn from the forms.

Trying out the idea for the first time, the contractor installed the guillotine panels in the haunch section of the forms. In this way the contractors readily determined whether they could pump concrete uphill as well as down. The first experiment proved successful. In practice, the contractor worked from the crown down, placing the guillotine panels 10-ft. 8 in. apart and spaced alternately 5 ft. out



6 After the upper half of sidewalls are poured, this jumbo rolls into place to support the forms for making arch pours. Concreting pipe goes up through the forms.

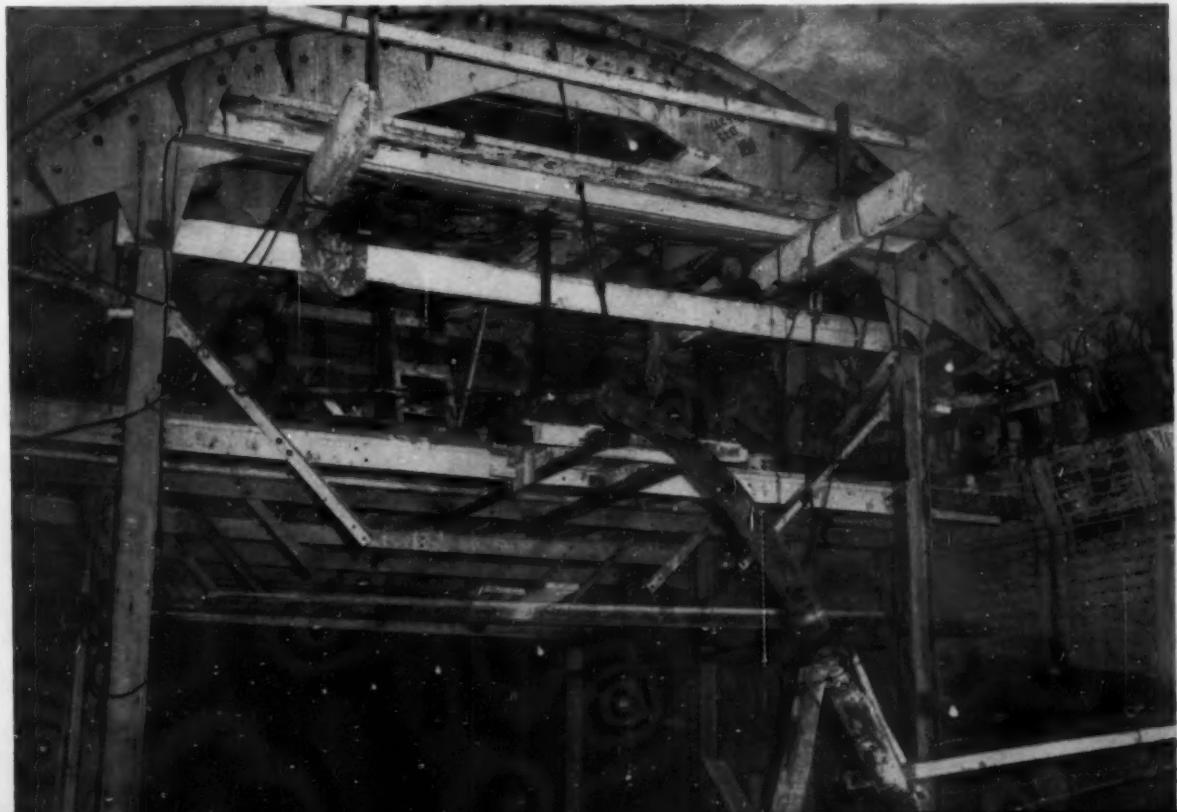
from the crown. Concrete was vibrated by units attached to the underside of the panels.

Further complicating the form design were the great pressures involved, resulting from forcing concrete into the area between the primary liner and form. In addition, the unequal diameters of the

rock and river sections of the tube had to be considered.

To make the necessary adjustments for the varying tunnel diameters, the forms were furnished with additional ribs and the panels were fabricated in multiples of the arch perimeter length. To withstand the tremendous pressures, the

7 Same form as above, but in place with concrete pipes connected. In the foreground is a completed portion of arch. Arch forms were heaviest ever designed by Blaw-Knox.





8 This close-up shows the guillotine connection for the concrete pipe.



Shown here is the only telescopic form on the job. Because forms must be left in place for 48 hours after a ceiling pour, these forms are designed to telescope through one another. In this way, ceiling pours aren't interrupted because of time required for curing.



10 A completed portion of the ceiling. Note scoring of walls for better bonding of tile—scores being made by wires welded to skin plates of upper and lower sidewall panels. Paper has not yet been removed from ceiling tiles which are placed prior to pouring.

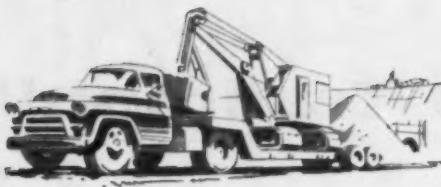
forms were designed to carry a 6,000-lb./sq. ft. load, making them the heaviest arch forms ever designed by Blaw-Knox.

Sidewalls are scored at the time of placing by a patented Blaw-Knox technique. Wires welded to the skin plates of sidewall panels leave horizontal grooves in the walls when the forms are stripped, thus offering a better surface on which to apply tile. The method of placing ceiling tile is a little different also. After the ceiling form is in place, tile is laid on its surface. When the forms are stripped, the tile is in place on the ceiling.

Lining the tunnel has required
(Continued on page 144)



11 Close-up of ceiling form.



Want to get there Quicker, Safer, at Lower Cost?

Eaton 2-Speed Axles Will Do It!

Eaton 2-Speed Axle trucks make quicker, full-load trips—with no sacrifice of power when it's needed to pull out of the tough spots. But they do more than save time; they save money, too. With double the conventional number of gear ratios right at their finger tips, drivers use the right gear ratio for every operating condition. This lets engines operate in their most efficient and economical speed range; stress and wear are reduced right down the line from the engine to the axle itself. Operating and maintenance costs are cut to the bone. And through improved maneuverability and reduced driver fatigue, Eaton 2-Speed Axle trucks make not only quicker trips but safer ones. They haul more at lower cost per mile, last longer, and are worth more when traded in.



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... for more details circle 273, page 16

ROADS AND STREETS, June, 1957

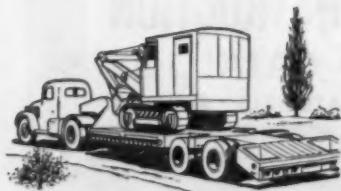
139

There's a Trailmobile Trailer for every



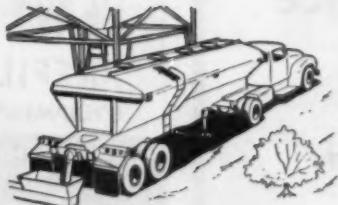
Trailmobile offers a single source of supply for every type of "heavy construction" trailer along with factory service facilities in 54 cities from coast to coast. Beyond this, many of Trailmobile's construction features were designed with time saving "on-site" maintenance in mind. All trailers are available on convenient financing up to five years for qualified buyers. For further information on new or used equipment, write Trailmobile Inc., 31st and Robertson, Cincinnati 9, Ohio.

highway construction need



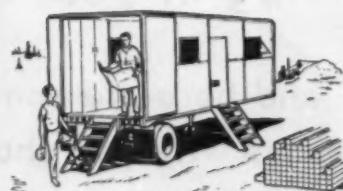
TRAILMOBILE LOW BEDS

... are used to deliver heavy road building equipment to the job area. Steel shovels, bulldozers and other large tractor-treaded units can be easily transported on these powerfully built trailers.



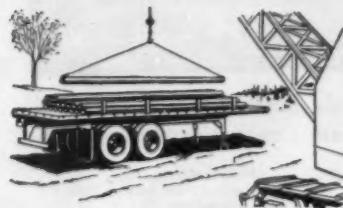
TRAILMOBILE CEMENT BULKERS

... transport large amounts of bulk cement to mixing plants at the job site. Both steel and aluminum types offer exclusive step-down design with twin screw discharge.



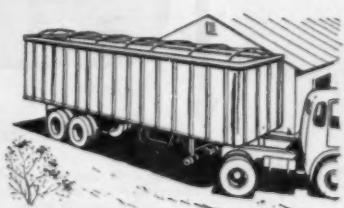
TRAILMOBILE FREIGHT VANS

... combine weather protection and mobility for hauling general supplies. Low cost used vans provide ideal job site offices, tool shops or storage facilities.



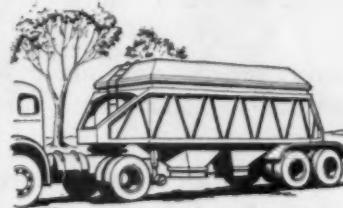
TRAILMOBILE PLATFORM TRAILERS

... are used for carrying lumber, cement forms, drainage tile, straw bales and sundry light equipment. "Sideless feature" permits simpler, faster loading and unloading.



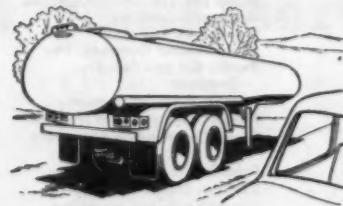
TRAILMOBILE OPEN TOPS

... are extensively used for carrying tools and construction materials. These units can be equipped with tarpaulin roof covers to protect contents against sun, rain or snow.



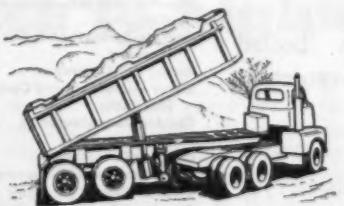
TRAILMOBILE HOPPER TRAILERS

... are used for carrying and spreading aggregate, gravel and sand. Bottom discharge permits uniform spreading of contents over a wide area.



TRAILMOBILE TANK TRAILERS

... are widely used for hauling hot asphalt, road oils, and the great volume of water required at the site. Most units carry a unique guarantee against tank leakage.



TRAILMOBILE HYDRAULIC DUMPS

... provide big capacity in a dump-type trailer for hauling and unloading sand and gravel. Unusually rugged construction guards against costly out-of-service time.

TRAILMOBILE INC.

31st & Robertson
Cincinnati 9, Ohio

Please send me further information on the trailer types I have indicated below:

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<input type="checkbox"/> Cement Bulkers	<input type="checkbox"/> Tank Trailers
<input type="checkbox"/> Freight Vans	<input type="checkbox"/> Hydraulic Dumps
<input type="checkbox"/> Open Tops	<input type="checkbox"/> Hopper Trailers

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TRAILMOBILE INC.

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... for more details circle 353, page 16

ROADS AND STREETS, June, 1957

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doubt . . . is the
most useful buying
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be USING IT DAILY!

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American-Marietta Company
American Steel & Wire
Anthony Company
Armcro Drainage & Metal
Products, Inc.
Arrow Manufacturing Company
Austin-Western
Baldwin-Lima-Hamilton Corp.
Barber-Greene Company
Blaw-Knox Company
Briscoo Manufacturers of
California
Brox Boiler & Mfg. Company,
Wm.
Buffalo-Springfield Roller
Company
Butler Bit Company
Carey Manufacturing Company,
The Philip
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Company, Inc.
Chrysler Corporation
Clark Equipment Company
Cleaver-Brooks Company
Cleveland Formgrader Company,
The
Cleveland Trencher Company,
The
Colorado Fuel and Iron Corp.,
The
Concrete Sawing Equipment, Inc.
Construction Products Sales
Continental Motors Corporation
Cummer & Son Co., The F. D.
Cummins Engine Company, Inc.
Detroit Diesel Engine Division
Dow Manufacturing & Sales Co.
Erie Strayer Company
Flexible Road Joint Machine
Company, The
Flintkote Company, The
Gar-Bro Manufacturing Company
General Motors Corporation
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Company, The
Goodall Rubber Company
Gunderson-Taylor Machinery
Company
Hornischfeger

Heil Company, The
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Company, The
Hensley Equipment Company,
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Hough Co., The Frank G.
Huber Warco Company
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Company, Inc.
Stow Manufacturing Company
Symons Clamp & Mfg. Company
Timken Roller Bearing
Company, The
Toncan Culvert Manufacturers
Association
Tampa Manufacturing Company
United States Motors Corporation
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United States Steel
United Steel Fabricators, Inc.
Viber Company
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Corporation

B.F. Goodrich



All-Nylon B.F. Goodrich tires give over 4 years' service to highway excavator

GASPARINI EXCAVATING CO., INC., of Peckville, Pennsylvania, does highway and heavy construction work. Here the company's equipment is at work on the Pennsylvania Turnpike, hauling giant loads over rock-strewn roads. For this rugged work, the company uses B.F. Goodrich FLEX-RITE nylon tires, reports many give over 4 years' service, including 2 retreads.

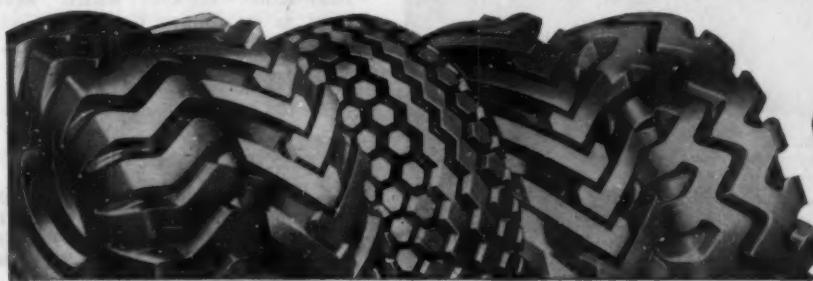
"B.F. Goodrich all-nylon tires have minimized breakdowns, impact breaks and other cost and time-consuming delays," writes President Gene Gasparini. "They help us give maximum contract performance in the shortest contract period."

B.F. Goodrich tires are built with FLEX-RITE nylon cords. FLEX-RITE nylon cords withstand double the im-

pact of other cord materials, resist heat blowouts and flex breaks. Result: more retreadable B.F. Goodrich tires!

Your B.F. Goodrich dealer has a complete line of tires for every off-the-road job, including the new Rock Service Tubeless or tube-type (far left) for mining, quarrying and dirt-moving jobs. And he offers expert, on-the-job tire service. See him today or write *B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.*

Specify B.F. Goodrich tires when ordering new equipment



... for more details circle 284, page 16

ROADS AND STREETS, June, 1957

B.F. Goodrich
FIRST IN RUBBER

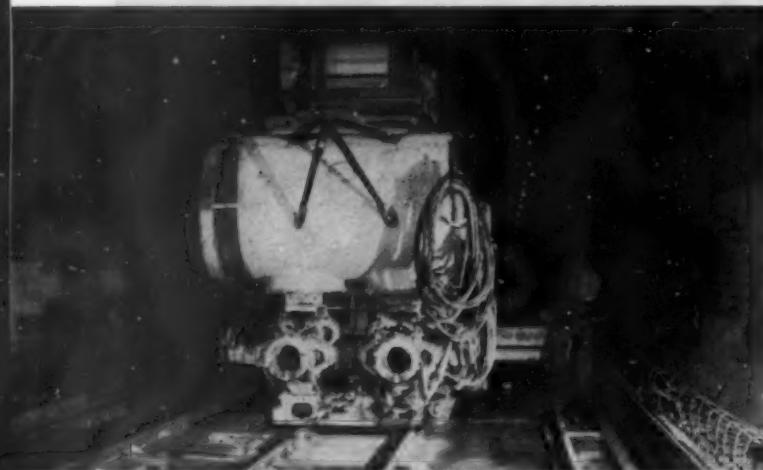
Your B.F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book



12 The ceiling form is moved with a mechanized trawler.



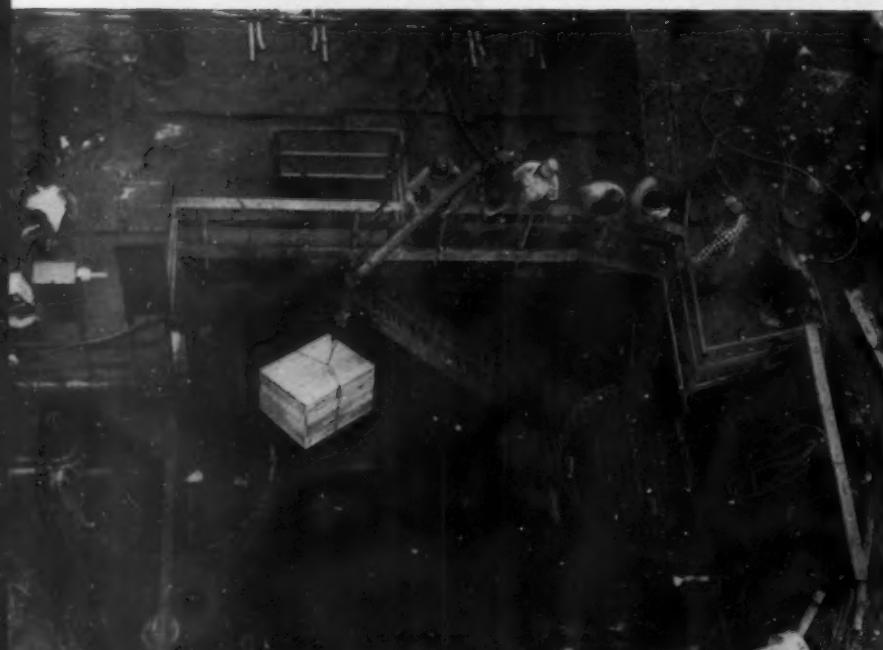
13 This Blaw-Knox-designed conveyor carries concrete from Jaeger agitators to a Rex pumpercete.



14 Rex 200 Double Pumpercete with a 3-cu. yd. hopper used to pump concrete for the sidewalls, arch and ceiling. Concrete is pumped out through two 8-in. pipes.



15 Viewed from the opposite end, the boot hopper into which agitators dump.



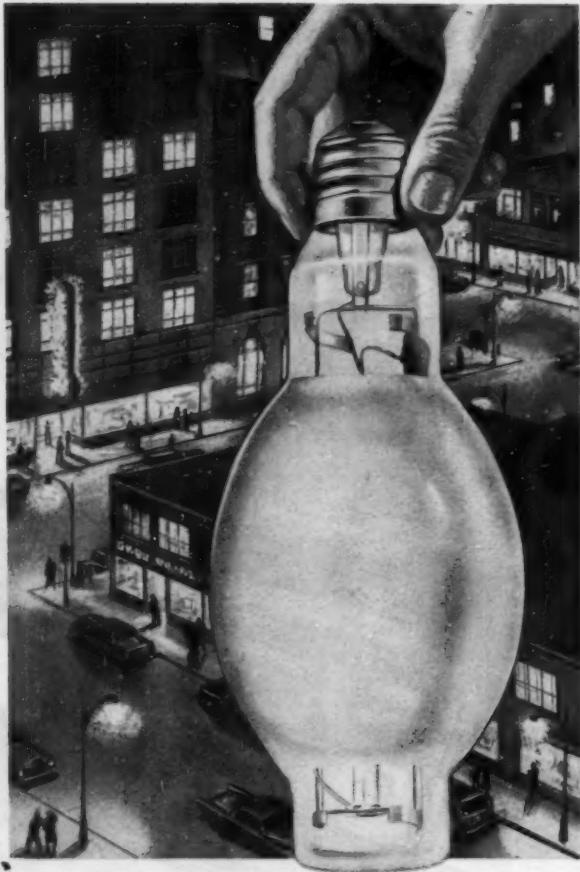
THIRD LINCOLN TUBE

(Continued from page 138)

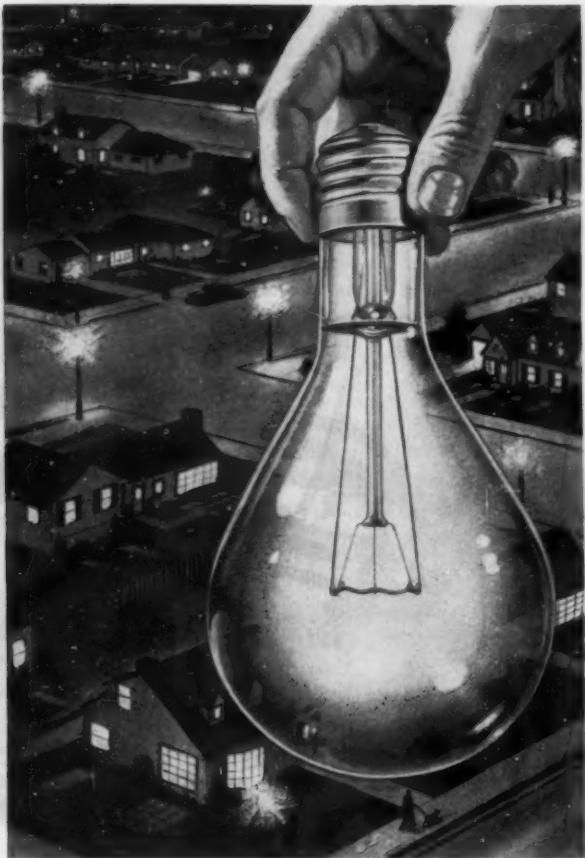
43,000 cu. yd. of concrete, all of 3,000-psi quality with the exception of the ceiling which is 4,000 psi. About 300 cu. yd. per day was placed. To assure a constant supply of concrete, transit mix trucks delivered to two air-operated 8-cu. yd. Blaw-Knox buckets which were used as stationary hoppers. Concrete was discharged from the buckets.

(Continued on page 149)

16 Concrete was supplied to job by transit mix trucks which dump into 8-cu. yd. Blaw-Knox concrete buckets. Truck at top right is dumping into bucket at right.



You get as much as 20% MORE LIGHT from your present mercury vapor street lighting system! That's the big plus you get with Sylvania's new SILVER-WHITE lamp—the most efficient mercury vapor lamp ever made.



TOP EFFICIENCY for your incandescent lighting systems—plus the uniform quality that lets you enjoy all the benefits of group replacement. That's the combination of economy and performance Sylvania incandescents offer.

Get top efficiency from every lighting dollar with Sylvania Lamps

If your lighting system includes incandescent or mercury vapor—or both—get top value from every budget dollar with high-efficiency Sylvania Lamps.

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For today's biggest buy in lighting, specify Sylvania's new SILVER-WHITE mercury vapor lamp. These new lamps actually offer a 10% to 20% increase in light output over clear mercury lamps, because Sylvania's Orthophosphate coating converts normally wasted ultraviolet into extra, usable light. SILVER-WHITE mercury lamps are now ready to help

you get more light from your existing fixtures in these popular types: 100-watt PS-25, 175-watt BT-28, 400-watt BT-37, and 400-watt reflector type R-57. And SILVER-WHITE's extra efficiency is yours at no increase in cost over standard color-improved mercury lamps.

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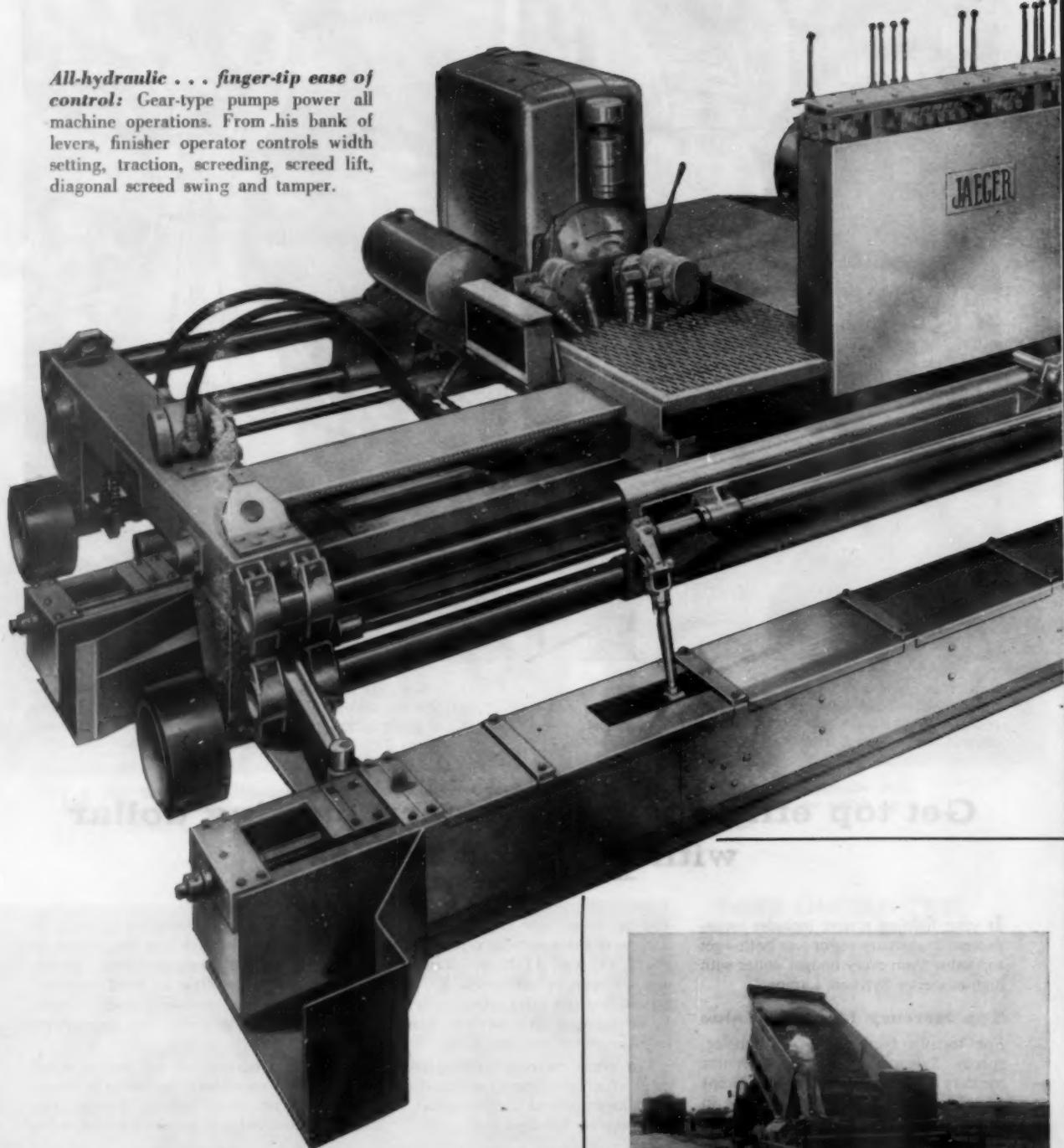
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... for more details circle 331, page 16

ROADS AND STREETS, June, 1957

All-hydraulic . . . finger-tip ease of control: Gear-type pumps power all machine operations. From his bank of levers, finisher operator controls width setting, traction, screeding, screed lift, diagonal screed swing and tamper.



6' of infinite width adjustability, with the touch of a lever: Hydraulic power extends telescopic tubular frame as desired, up to 3' on each side—6' in all. A tremendous time and labor-saving advantage on today's work where gradual width changes are increasingly required.



Ideal for laying stone for highway and airport base.

All-hydraulic self-widening Jaeger "JX" Finisher

today's most efficient paving tool



Complete hydraulic operation—Finger-tip control:

Touch a lever to change machine width up to 6' and to perform every travel and screed operation, including diagonal setting of rear screed, by smooth hydraulic power. No mechanical transmissions or clutches. Even tamper attachment and transportation mounting are hydraulically operated.

6' of infinite width adjustability—by hydraulic power: 12'-18' and 24'-30' are standard; special widths from 9' available.

Diagonal rear screed for pitched slab and curves: Adjustable as needed to work material up-hill and compact it against higher form. Saves carry-back. Quick crown change screeds adjust with single lever movement. (Conventional screeds and transverse rear screed, optional.)

Vibratory "bullnose" front screed or vibratory pan or tube attachments. Traction wheels for every condition.

You're years ahead in finishing capacity and precision with a Jaeger Type "J" or "JX" finisher. See your Jaeger distributor, or write for complete data, today.

THE JAEGER MACHINE COMPANY

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Low Cost Jaeger Aggregate Spreader Does Big Work



Laying 200 tons of base mix an hour, in four 3" courses.

If you have a job of laying base or surface aggregate up to 13' widths and 12" thickness, or plant-mixed stabilized soil or any free-flowing bituminous material, you can save yourself money with a Jaeger self-propelled SPS-3 spreader. Costs only half the price of a bituminous paver; lays highway and airport base, and both base and top of secondary roads, parking areas and drives as fast as trucks can deliver material. Crawlers operate on subgrade—no traction on newly-laid material to cause high or low spots. Straightedge runners, supporting strike-off, average out subgrade irregularities. Blender gates and wings make perfect joints. Agitator bar attachment for handling stiff stabilized soil mixtures, if desired. Get new Catalog SPS3-7.

... for more details circle 298, page 16

ROADS AND STREETS, June, 1957



Buy your excavator like you'd make ANY investment and you'll buy BUCYRUS-ERIE

in-vest'ment (in-věst'měnt), *n.* the investing of money or capital in order to secure profitable returns . . .

No matter how you look at it, your investment in a Bucyrus-Erie excavator measures up . . .

PROFITABLE RETURN

You know you can expect profitable returns from a Bucyrus-Erie excavator — just as generations of loyal owners have.

INCOME DEPENDABILITY

A Bucyrus-Erie excavator stays on the job, continues to earn. Each model is engineered and built from boom point to mounting for a specific rated capacity. There's no overdriving to create "new" models, no overpowering that shortens the useful life of the machine by excessive wear.

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Your Bucyrus-Erie excavator stays young with a minimum of maintenance, keeps its original performance values for many years of money-making service. That means high resale value, too. Simple design and strong, large parts — few in number and easily accessible — assure ease and economy in upkeep. Main machinery is securely anchored on one-piece frame, keeps perfect alignment.

RELIABLE COUNSEL

Your Bucyrus-Erie distributor will be glad to help you select the right machine for your specific requirements from the complete line, $\frac{3}{8}$ to 4 cubic yards.

335E57

**BUCYRUS
ERIE**

SOUTH MILWAUKEE, WISCONSIN

... for more details circle 252, page 16

ROADS AND STREETS, June, 1957

THIRD LINCOLN TUBE

(Continued from page 144)

ets into Jaeger 4 1/4-yd. agitators which usually were teamed in trains of two and engine-drawn to the concreting site. Operating on the tunnel roadway, the agitators dumped into a Blaw-Knox belt conveyor which fed the concrete to the Rex Pumpcrete. The only unformed gravity placed concrete in the tunnel was the invert.

Nine separate pours were required for completion of a tunnel cross section. First pour was the invert, which comprised about 60 degrees, and was hand screeded to the proper elevations. This was followed by a pour which completes the invert, fresh air duct and roadway. Lower sidewalls followed by upper sidewalls and arch were then poured. This left the ceiling and sidewalk for completion.

The ceiling forms, 384 ft. long, were the only telescopic forms on the job. All other forms were designed to be introduced at one end of the tunnel and work through in line for removal at the opposite end. Because ceiling forms must be left in place for 48 hours after a pour, when a ceiling form can be removed, it is telescoped and passed through the form ahead. Thus ceiling work can be carried on more continuously.

Of the \$100 million being spent on construction of the tunnel, the tube itself will run less than \$20 million. Mason & Hangar Co., A. A. Johnson Corp. and MacLean-Grove & Co. are joint contractors for the tunnel.

California Cost Index Rises For First Quarter of 1957

As reported by Richard H. Wilson, assistant state highway engineer; H. C. McCarty, office engineer; and Lloyd B. Reynolds, assistant office engineer.

The California Highway Construction Cost Index for the first quarter of 1957 made a sharp rise after a gradual return to an upward direction in the fourth quarter of 1956. The index stands at 277.7 (1940-100) which is 25.5 index points or 10.1 percent above the fourth quarter of 1956. This quarter established a new high in the history of the California index. The previous high of 255.9 was established in the second quarter last year.



17 Jaeger agitator takes a charge from the Blaw-Knox hoppers located above in the shaft.

The regularly expressed view of this department that construction costs will continue in an upward direction remains unchanged. Conditions existing with materials and labor are having the effect of reduction in the rate at which costs are increasing. This effect is occasioned by the long-term labor contracts that were negotiated last year in many of the fields affecting highway construction.

While the index as calculated for this quarter bears out our statement that costs will continue upward, conditions surrounding two extremely large contracts totaling \$12,200,000 that were awarded during the period resulted in unfair weight in this instance.

An alternate determination of the index was made in which the two projects were eliminated from consideration. The alternate index shows 249.6 Index points as against 277.7 noted above, and is only 1.0 percent below the fourth quarter of 1956.

Interest of bidders in highway construction during this quarter no doubt accounts for a large portion of the reduced costs reflected by the alternate index. Bidders per project averaged 7.0 for the quarter, compared with 5.1 and 3.7 in the two previous quarters. Projects attracting from 12 to 17 bidders were common. It remains to be seen whether these favorable prices result from the contractors' urgent desire for work or from savings to be accomplished through newly developed practices, techniques, and better equipment.

Movie on the Causes of Lost Job Production

The Bureau of Public Roads recently announced the release of a new motion picture, "Lost Production in Highway Construction." The film, based on extensive studies conducted by the bureau, examines minor delays that affect production rates of key units of highway construction equipment, including power shovels, scrapers, hot-mix bituminous plants, and pavers.

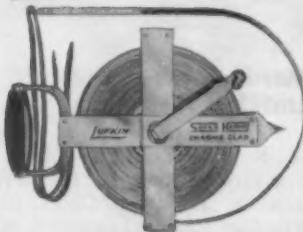
As stressed in this motion picture, most minor delays in highway construction jobs are timed in seconds; but the seconds add rapidly into hours and lost dollars for the contractor and higher roadbuilding costs to the public. Minor delays cannot be eliminated completely, but greater efficiency by the contractors will mean that roads will be put into service sooner and at lower cost. Contrasts in operation practices shown in the motion picture are very revealing.

The motion picture is a 16-mm. sound and color film with a running time of 30 minutes. Prints may be borrowed for showings by any responsible organization by request addressed to Visual Education, Bureau of Public Roads, Washington 25, D.C. There is no charge except for the express or postage fees. Requests for the film should be sent well in advance of the desired showing and alternate dates for showing should be given if possible. Prompt return after each showing is necessary so that all requested bookings may be fulfilled without delay.



LUFKIN SUPER HI-WAY DRAG TAPE

EASY TO READ
MARKINGS
THAT ARE DURABLE



398

Extra heavy tape steel is etched away to leave full strength line with markings raised in bold relief. Raised protective edges and jet black background provide long wear and make markings easy to read. Chrome Clad finish resists rust and corrosion, won't chip, crack or peel. Each foot marked — and feet graduated to 100ths ft. 100-200-300 feet lengths.

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TAPES • RULES
PRECISION TOOLS
FROM YOUR SUPPLY STORE

THE LUFKIN RULE COMPANY
Saginaw, Michigan

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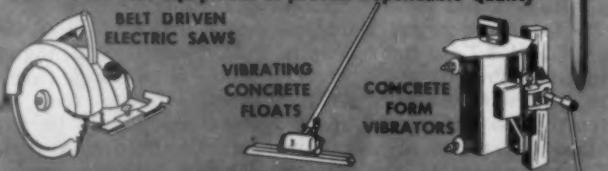
SYNTRON

GASOLINE HAMMERS PAVING BREAKERS-ROCK DRILLS

100% self-contained, free from cables and batteries or compressors and hoses. Portable and compact -- one-man operation. Ideal as an auxiliary tool for busting concrete, cutting, digging and many other construction or maintenance jobs. Rock Drills available for high speed drilling. Blow holes clean to 20-ft. depth. Automatic bit rotation.

Builders of Quality Equipment for more than a Quarter-Century.

Other SYNTRON Equipment of proven Dependable Quality



Complete Tool Catalog available upon request.

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SYNTRON COMPANY

384 Lexington Ave. Homer-City, Penna.

... for more details circle 332, page 16

150

New Publications

Bureau Issues New Standard Construction Specs Book

The Bureau of Public Roads, U. S. Department of Commerce, has just published, through the government printing office, an important 363-page book entitled "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects." As indicated by the title, the book is intended primarily for use in the construction of federal road and bridge projects under the direct supervision of the Bureau. Such projects include work for which Public Roads received direct appropriations, as for major highways through national forests, and work performed by Public Roads for other federal agencies on highways both within and outside of the federal domain.

The book, which for simplified reference may be cited as "FP-57," supersedes a previous publication, "Specifications for Construction of Roads and Bridges in National Forests and National Parks (FP-41)," issued in 1941.

• The new book contains up-to-date specifications for those items of work and materials and construction methods that are generally applicable to direct federal highway contracts. They are considered to be good specifications which will result in highway work of high quality. These specifications are not required or intended to be used in federal aid highway work performed by the states with funds administered by the Bureau of Public Roads since, as prescribed in the basic federal aid highway legislation, each state prepares its own specifications for federal aid highway construction, subject to approval by Public Roads. However these specifications will undoubtedly be of interest to specifications writers in particular and to most engineers engaged in highway design and construction, as well as to engineering students.

During the preparation of the new specifications, the material was reviewed by both field and office engineers of the Bureau and by committees and individual representatives of national organizations of highway contractors and of producers and suppliers of materials and equipment. The benefit of their

(Continued on page 163)

ROADS AND STREETS, June, 1957



One of Watkins' 26 Macks receiving a load of crushed gravel from a crusher fed by a 1½-yard shovel.

on the Spaulding Turnpike . . . big-yardage fills at low hauling costs

Grading a three-mile section of New Hampshire's Spaulding Turnpike, R. G. Watkins & Sons, Inc. of Amesbury, Massachusetts, put down 1,580,000 cubic yards of common borrow and 100,000 cubic yards of gravel. This pike, with two 24-foot lanes separated by a 12-foot median, is a 22-mile addition to the Seacoast Turnpike near the White Mountain area. High fills along the Cocheco River and at intersecting roads required big yardage borrow.

Fourteen of the 17 dumpers used by Watkins & Sons on this high-volume hauling were Macks.

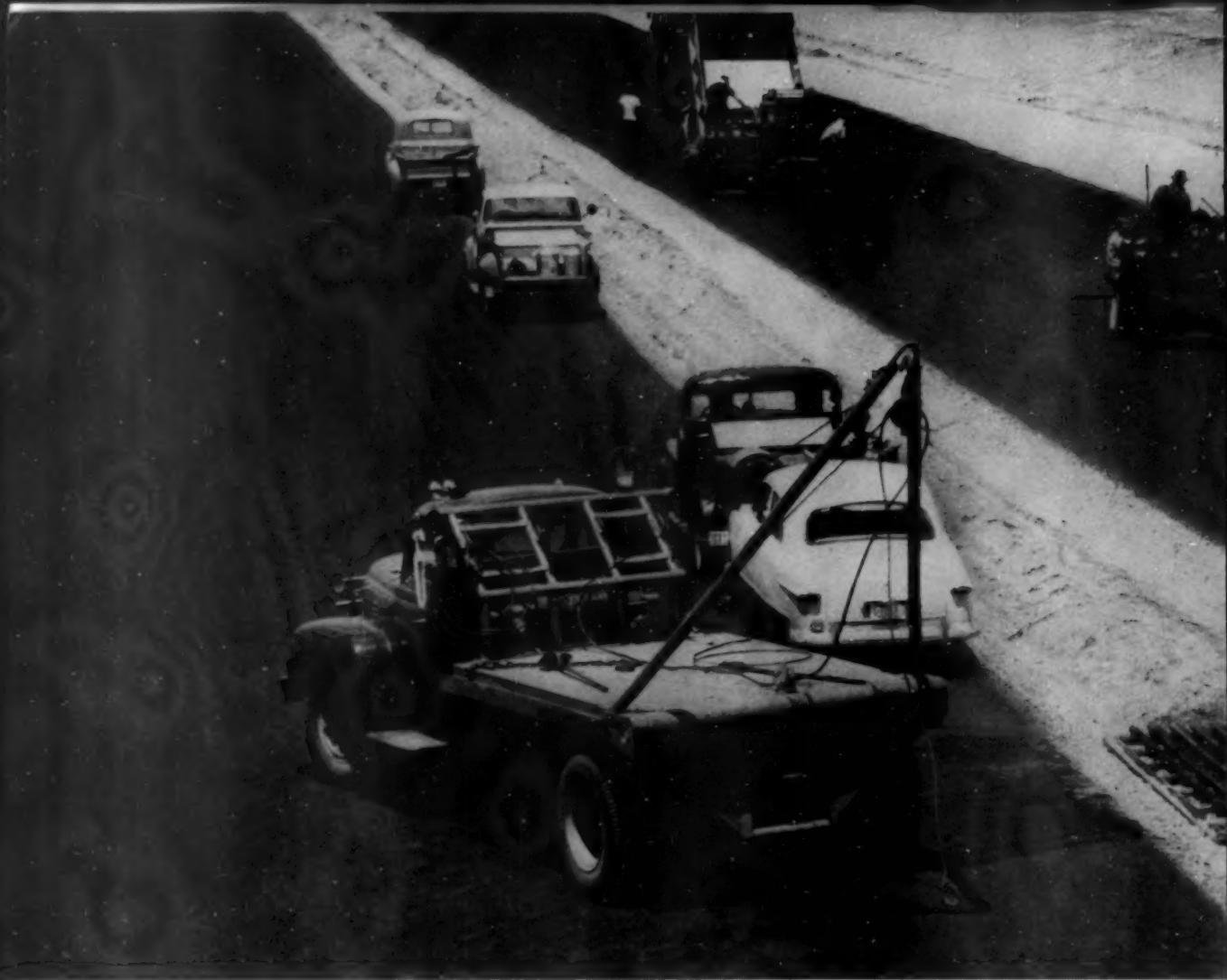
Here's the kind of job where Mack efficiency and dependability really pay off in minimum hauling costs. The ability to maintain tight schedules, to keep going month after month with only routine servicing and maintenance, and to operate with ease over difficult terrain and in all kinds of weather puts Macks in a class by themselves for real profit-making performance. Reason enough why Watkins & Sons has 26 Macks in its fleet of 32 dumpers.

Why not let your Mack representative bring you up to date on

the most complete line of heavy-duty trucks in the industry? Dumpers, mixers, tractors, flat-bed trucks—there's a Mack that will do your toughest jobs more economically, more efficiently, and more profitably. Mack Trucks, Inc., Plainfield, N. J. In Canada: Mack Trucks of Canada, Ltd.

MACK
first name for
TRUCKS

5023



AMERICA'S "GRAND PLAN" OF MODERN ASPHALT

...because highway construction

The Federal Highway program is barely under way. Yet, construction costs already have gone up 4%, according to official figures.

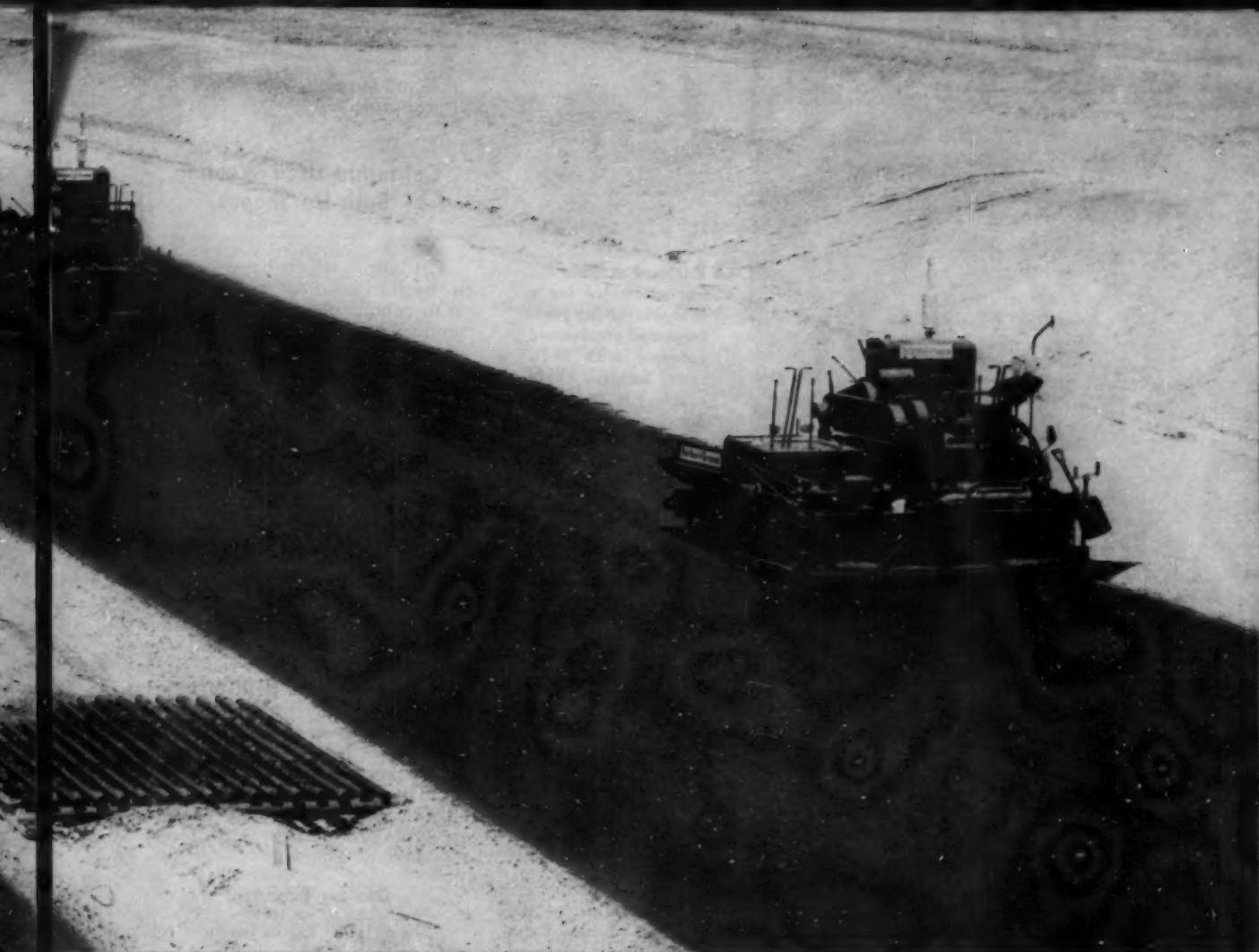
But here's good news! Savings from durable Asphalt construction . . . savings from low, quick and easy maintenance . . . can go a long way toward keeping the costs of *your* much-needed new roads within your ability to pay.

Experts say that *3 billion dollars* in original costs alone can be saved on the Interstate System with modern Asphalt pavement. And a substantial part can be realized by *your* state . . . *your* community.

SMOOTH-RIDING, SAFE HIGHWAYS ARE YOURS, TOO
Yes, at lower cost to the taxpayer, Asphalt pavement provides more, better and wider highway. With smooth-riding, tough, resilient, skid-resistant surfaces. Glare absorbent pavement that is easier on the eyes. Lane markings that are easier to see day and night.

No wonder that four out of five miles of paved roads in the U. S. are surfaced with Asphalt!

So, specify Asphalt construction now! You won't have to worry about getting Asphalt, either . . . when the time comes. For, unlike some other construction materials, **Asphalt is in plentiful supply.**



Construction Scene on Kansas Turnpike

NEEDS THE ECONOMY PAVEMENT

costs are rising

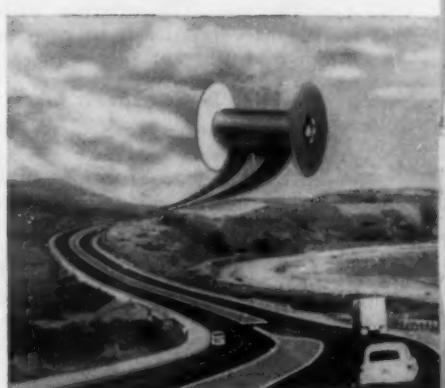
... for more details circle 243, page 16



MODERN ASPHALT CONSTRUCTION is a triumph of road-building science. With built-up layers that spread the load . . . hug the earth . . . absorb shock and pounding without cracking. Layers topped off with smooth-riding yet textured skid-resistant modern Asphalt pavement. Economy, comfort and safety are built in to last . . . with this modern durable Asphalt construction. Built in to save you tax-dollars.



THE ASPHALT INSTITUTE, Asphalt Institute Building, College Park, Maryland



Ribbons of velvet smoothness . . .
MODERN ASPHALT HIGHWAYS



ADAPTING TO SHORTAGES

(Continued from page 127)

many states have been used at a minimum or entirely eliminated for the present. Precast piles have proved the best substitution in some states and driven steel shells, concrete filled, in others.

It is hardly surprising to learn that the manpower shortage has resulted in a wider use of consulting engineers for bridge design. Bridges, particularly larger ones, have been a special field of the consultant. Today they are contributing to the ideas for standardization and aiding the adoption of streamlined procedures. E. R. Needles, of Howard, Needles, Tammen & Bergendoff, New York and Kansas City, speaking at a recent convention, urged the speediest possible development of a "library" of program data for use in connection with electronic computer solutions to bridge and other problems.

Bring in Consultants

Michigan and Minnesota are among the states which have farmed an increasing load of bridge and grade separation design work to consultants. In this connection, H. R. Puffer, bridge engineer in Michigan, said, "I believe we find ourselves in much the same position as the other various states in that we are not able to build up our forces with engineering per-

sonnel, as we would like to, and it has been necessary for us to avail ourselves of the services of consulting engineers in order to meet the demands of the expanded highway program. We are continuously looking for new ways to reduce the amount of engineering work required on bridge plans."

Noted A. E. LaBonte, bridge engineer in Minnesota, "Due to the shortage of personnel we have been forced to use consulting engineer firms for practically all of our bridge designs. Twenty such firms are now furnishing service in connection with bridge plans. We have prepared layouts showing corner details of various types of superstructures and substructures for both square bridges and for various degrees of skewed bridges. These layouts are furnished to a consulting engineer so that all firms are preparing plans which we hope can be interchanged between substructures."

ture and superstructure for future bridge projects."

California Used Welding, Built-Up Shapes

California, which has long been in the lead in bridge design as well as in volume of bridge work, has a number of practices and problems of its own. Following are excerpts from a letter from A. L. Elliott, bridge engineer (planning):

"Our staff has had difficulty for so many years in obtaining rolled shapes that we have widely adopted welding. Plates being more readily available, we have been able to design efficient sections for our needs. This began before the recent steel shortage.

"For all jobs we make an economic study of the type of structure and material for its construction best suited to the location and conditions. This study may result in a steel bridge or one built of either conventional or prestressed concrete. For those structures which we feel are best built of steel, we must allow for the expected delivery delay. If there is no apparent advantage to either steel or concrete, the slow delivery date of steel may become a factor.

Delivery Important

"The delivery factor becomes important in the choice between prestressed concrete and steel only in those cases where the choice is an even one as regards cost and other items. There have been rare cases where available construction time was not sufficient to wait for steel and prestressed concrete was chosen instead. In fairness to the structural steel industry, however, it must be stated that for such jobs as the Carquinez bridge or flood emergency work a reasonable effort is made to supply the state's needs.

Bridge Specification Being Revised

The Bridge committee of the American Association of State Highway Officials has sent to the various bridge engineers of the highway departments a set of proposed revisions on bridge specifications. These include a section on composite design, a change in the section on concrete columns, changes in wind loading, welding and some revision in the H-20 live load design. Comments and recommendations have been received and are under consideration.

Precasting Job Begins for 225 Bridges

on Illinois Toll Road

By Hubert C. Persons, Contributing Editor

CASTING beds were being rushed in recent weeks at three locations for making prestressed concrete girders for 225 bridges on the Northern Illinois toll highway. Structural steel is being used on 67 other bridges on the toll road, as part of \$150 million in contracts awarded for the 193-mile project. Two other bridges will utilize both concrete and steel girders.

Bid prices for the 225 bridges totaled \$9,762,302.73. The work has been awarded in four contracts calling for manufacture of girders and delivery at the sites with all accessories. Two contracts for a total of 119 bridges were awarded to Material Service Corp. at a total bid price of \$4,188,629.96. This company has established a casting yard near Algonquin in McHenry county with six 606 ft. long casting beds.

The Consumers Co., awarded a contract for 53 bridges at \$2,673,959.41, is establishing a casting yard at McCook.

A third contract for 51 bridges was awarded to the American-Marietta Co., at \$2,899,712.86. This company is building casting beds in the plant of its subsidiary, the Lewiston Pipe Co., at Hodgkins, Ill.

In addition to these three casting yards, Midwest Prestressed Concrete Co. has established facilities at Rochelle, Ill., to take some of the work under subcontracts.

Three sizes of girders are required: 36 x 24 in., 48 x 24 in., and 48 x 28 in. Prestressing wire $\frac{7}{16}$ in. is specified with an ultimate tensile strength

of not less than 240,000 psi. More than 18 million linear feet of this wire is called for.

Of the 36-in. girders, 811 individual members are required for a total of 38,927 lin. ft.; of the 48 x 24 in. girders, 3,290 units totaling 246,548 lin. ft.; of the 48 x 28 in. girders, 1,561 units totaling 131,325 lin. ft. The job will require 89,000 cu. yd. of prestressed concrete as presently outlined.

The bid prices or the prestressed girders average as follows:

36" x 24" girders	— \$11.18	per lin. ft.
48" x 24" girders	— 13.28	per lin. ft.
48" x 28" girders	— 15.86	per lin. ft.
$\frac{7}{16}$ in. strand	— 0.1697	per lin. ft.

Erection of the bridges will be carried out by the contractors on each construction section.

Type I portland cement with the addition of an ASTM-approved air-entraining agent has been specified for the bridge members. The concrete is to be a $6\frac{3}{4}$ sack mix with 3-in. slump, maximum size $1\frac{1}{2}$ in. Entrained air is 3 percent plus or minus 0.5 and water-cement ratio 5 gal. per sack. Required compressive strength at 28 days, 5,000 psi.

The bridges were designed under the direction of M. E. Bender, chief bridge engineer, and George F. Bishop, project bridge engineer of Joseph K. Knoerle & Associates, Inc., consulting engineers for the Illinois Toll Highway commission. George L. Jackson is chief engineer of the commission.

"While the major part of our work deals with complex freeway layouts which do not lend themselves too well to standardization and simplification, we do conserve engineering manpower by making the maximum use of our old plans where applicable.

"For some time we have been using IBM equipment for quantity calculations and traverses and are now studying IBM methods for wider application in bridge design."

Thus California is a member of the growing contingent of states applying business machine techniques.

A supplementary article will give observations on practice by several additional state highway bridge engineers.

Missouri Has 1,567 Units On Highway Maintenance

The Missouri state highway department in its recent Biennial Report gave a summary of the maintenance and operating equipment owned by the department. Its fleet includes 494 automobiles, 1,567 trucks of various sizes and types, 891 tractors, 594 motor graders, 76 pull-type graders, and 819 pieces of miscellaneous equipment.

Among the miscellaneous units were reported the following units:

Air Compressors	42
Asphalt Kettle Trailers	162
Aerial Ladders	2
Bituminous Mixers	32
Bulldozers	19
Centerstripers	6
Concrete Mixers	18
Conveyors	14

Crusher-Athey	1
Drill-Core	1
Drills-Sounding	19
Distributors-Truck	66
Hard Pan Plows	5
Heaters-Tank Car	64
Hoists-Portable	1
Loaders-Propelled	26
Loaders-Front End	200
Mud Jacks	7
Pavement Breakers	1
Pumps-Car Unloading	27
Pumps-Centrifugal Water	3
Radio Mobile Units	33
Roads Discs	7
Road Magnet	1
Rollers	25
Sandblast Units	2
Scrapers	11
Shovels	8
Snow Plows-Rotary	1
Sweepers-Self-propelled	2
Trailers	8
Welders-Electric	5

Modern Garages Strategically Located

Have Stepped Up Our Maintenance Efficiency

By C. E. Shumate

Administrative Engineer,
Colorado Department of Highways,
Denver

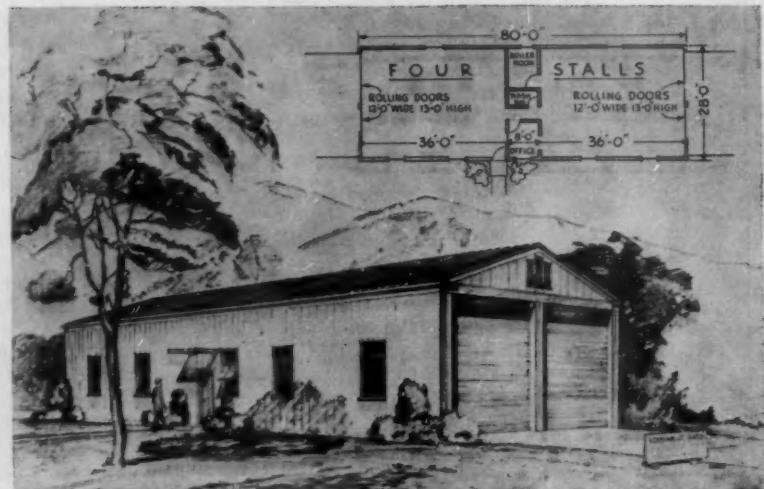
IN COLORADO where we have a rugged climate and a large area (105,000 sq. miles) to cover, we have learned that a practical answer to our maintenance administrative problem is to disperse our equipment. This has been done in small, compact groups over the state rather than as larger assemblies at relatively few locations.

This method places small equipment sheds at many locations throughout the state—in contrast to the operation in most states where large garages are set up in each district to house all the equipment for that area.

Colorado does, of course, make use of one large equipment storage



● Equipment shed for the Colorado department of highways—typical of numerous Armco steel buildings used for this purpose—64 ft. long, with over-head-type doors.



● Typical plan of a Colorado highway equipment shed for dispersed maintenance facilities. (Armco Drainage & Metal Products, Inc.)



and repair facility for each of its five districts. But these are used essentially for headquartering the maintenance activities of each district.

Within each district the highway department has established maintenance sections. Each section consists of a number of patrols with

(Continued on page 160)

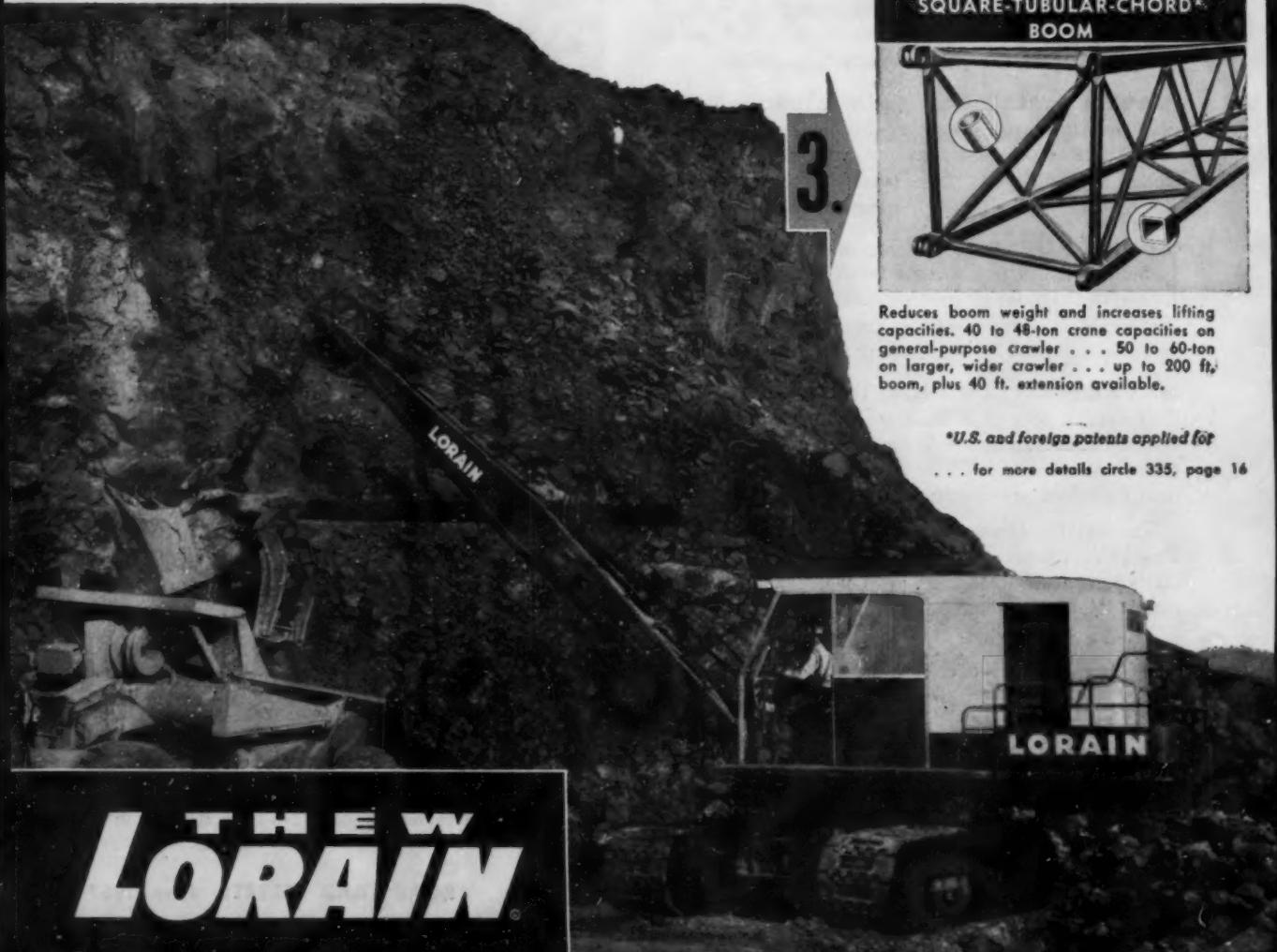
● Smaller (36 ft. long) equipment shed erected within the highway right-of-way. Fenced area for materials storage; parking and outdoor storage area with gravity fueling dock in foreground.

the **BIG 3** → puts the 2½-yd. LORAIN-85A years ahead!

These 3 big features will mean more to you in profits than anything you can find in any other 2½-yd. shovel-crane. They mean greater operating ease, longer life, increased crane capacities and reduced maintenance. Of course, there are many more features in the Lorain-85A . . . torque converter power-take-off, new "operator designed" cab, full air controls of all crawler operations, removable counterweight, are but a few. The Lorain-85A is years ahead in the important features that will put you "way ahead in profits."

Be sure you know all about the "85A" . . . your Thew-Lorain Distributor will explain every detail!

THE THEW SHOVEL CO. Lorain, Ohio



THE
LORAIN

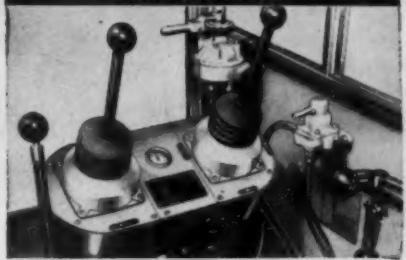
"SHEAR-BALL"** TURNTABLE MOUNTING



1.

Turntable is secured to crawler and revolves easily and freely on a huge "ball bearing." No center pin or nut, centering gudgeon or exposed roller path . . . no turntable rollers . . . no constant adjustment, maintenance or lubrication problems.

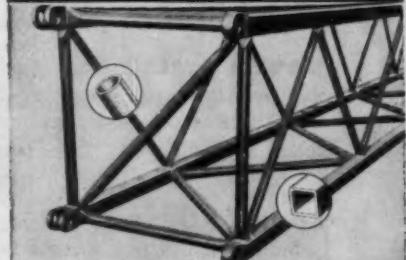
2-LEVER, "JOY-STICK" AIR CONTROL



2.

The newest of all shovel-crane power controls. "Metered Air" feeds power to clutches at any rate desired — yet operator retains full "feel" of all operations. Fewer levers, fewer motions, faster, smoother, less effort, less fatigue.

SQUARE-TUBULAR-CHORD* BOOM



3.

Reduces boom weight and increases lifting capacities. 40 to 48-ton crane capacities on general-purpose crawler . . . 50 to 60-ton on larger, wider crawler . . . up to 200 ft. boom, plus 40 ft. extension available.

*U.S. and foreign patents applied for

. . . for more details circle 335, page 16



NOW!

for Heavy

Ford's new fully automatic transmission provides six forward speeds . . . multiplies engine torque over 14 times for fast getaway and heavy going . . . retards speed on downgrades!

SAVES WORK! Just flick Transmatic's control lever to the desired driving range and you're done with shifting! Transmatic Drive thinks and works for you, ending the strain of constant shifting!

SAVES TIME! Transmatic Drive keeps loads moving! Starting torque is nearly double that of conventional transmissions. It automatically selects the right gear! You get away fast, reach high gear sooner! Transmatic ends shifting lag: maintains momentum!

SAVES FUEL! At cruising speeds you operate economically in direct drive with torque converter locked out! Under all driving conditions, Ford's new Transmatic Drive keeps engine speed within the most economical, most efficient range!

SAVES MAINTENANCE! Transmatic's hydraulic retarder acts as a built-in brake; saves service brakes! Clutch maintenance is eliminated. The power train lasts longer because shock loads are hydraulically cushioned—a critical factor on off-road jobs!

Transmatic Drive is another reason why Ford Trucks cost less . . . less to own . . . less to run . . . last longer, too! Call your Ford Dealer; he'll gladly come out, at your convenience, with full details!



Easier going up
No shifting lag. Transmatic preserves your momentum . . . automatically!

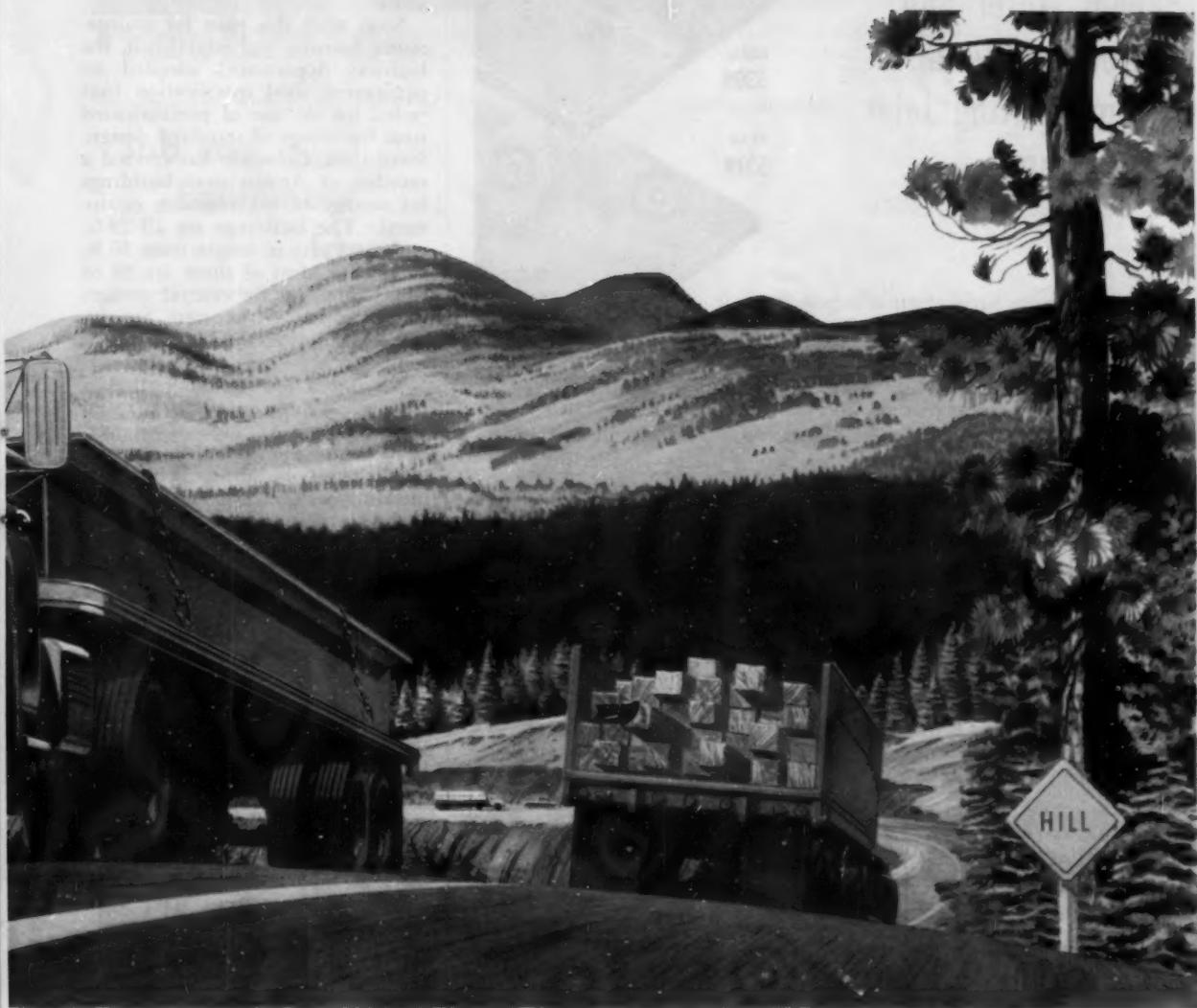


Easier going down
Sure control! The retarder acts as built-in brake; saves service brakes!



Easier on the level
No-shift driving in traffic; the right gear always!

TRANSMATIC DRIVE Duty FORD TRUCKS!



Time-saving, money-saving Transmatic Drive is available at extra cost on Ford trucks from 15,000-lb. GVW through 60,000-lb. GCW.

FORD TRUCKS COST LESS

...LESS TO OWN

...LESS TO RUN

...LAST LONGER, TOO!

... for more details circle 277, page 16

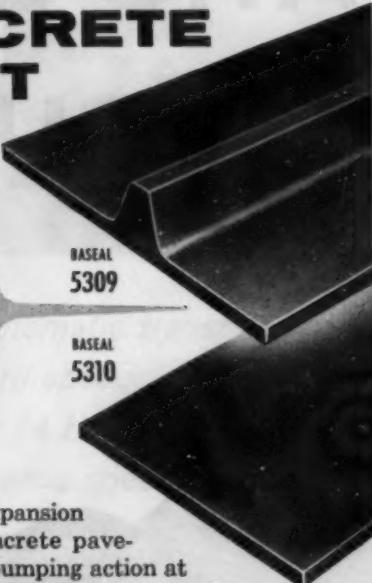
ROADS AND STREETS, June, 1957

SERVICISED

"BASEAL" rubber base plate

FOR CONCRETE PAVEMENT

Keeps Water And
Foreign Materials
From Entering Joint
At Bottom...



For maximum protection of expansion and contraction joints in concrete pavement, and the elimination of pumping action at joint intervals, be sure the *bottom* of the joint is protected against water seepage and the infiltration of foreign materials. Specify Servicised "BASEAL"—a resilient rubber base plate for expansion and contraction joints—made in two types, specifically designed for optimum performance and joint protection. "BASEAL" provides long-time protection because it is an extremely stable rubber compound, resistant to deterioration caused by fungus growth, etc.

Installation is simple. "BASEAL" is merely placed over the compacted pavement base prior to paving. Due to its resilient characteristics, the material will conform to the terrain after concrete is poured.

"BASEAL" is available in continuous lengths of 26 feet. Standard width is 6 inches.

Drawings at right show Servicised "BASEAL" in place in expansion and contraction joints.

Write for the **SERVICISED** Catalog which illustrates and details Servicised products for highway and heavy construction work.



SERVICISED PRODUCTS
CORPORATION

6051 WEST 65TH STREET • CHICAGO 38, ILLINOIS

for more details circle 322, page 16

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EFFICIENT GARAGES

(Continued from page 156)

equipment sheds where snow removal apparatus and other maintenance facilities can be housed for immediate use in the area. This dispersed housing makes possible the operation of equipment with the least travel time, not only for normal maintenance operations but for emergencies. The program was begun in 1938 and has proved to be most effective in the past 19 years.

Soon after this plan for maintenance housing was established, the highway department adopted an equipment shed specification that called for the use of prefabricated steel buildings of standard design. Since then, Colorado has erected a number of Armco steel buildings for storage of maintenance equipment. The buildings are all 28-ft. wide and vary in length from 36 ft. to 150 ft. Most of them are 36 or 64-ft. long, but for central garages in two districts the state has installed buildings 242 and 400-ft. long.

All but a few of the buildings have office space in addition to an equipment storage area. Two overhead doors are installed in one end of the 36-ft. building. The 64-ft. building has overhead doors at each end with office space in the middle.

These buildings have solved the problem of providing housing for widely dispersed equipment. Use of prefabricated steel buildings has enabled highway department crews to put up the structures quickly and economically without using outside labor. During the years these buildings have been in use there has been no damage from heavy snow or hail—normal winter weather for most of Colorado.

Maintenance of highways is under the direct supervision of district engineers for the Colorado department of highways, with headquarters in district offices. Mark Watrous is chief engineer.

New Society of Photographic Scientists and Engineers

A new national Society of Photographic Scientists and Engineers has been formed, merging memberships of two other technical groups. The new society combines the former technical division of the Photographic Society of America and the former Society of Photographic Engineers.



● Picking up big chunks of demolished concrete is done by International Drott TD-9.



● The same machine with the help of a sling is moving a 3,000 lb. 12 x 12 in. concrete precast beam.

Job and Equipment Ideas

Tractor-Mounted Clam Shows its Versatility

A few of the many chores that can be done handily with a crawler-mounted front-end clamshell loader are illustrated here. The machine is an International Drott TD-9, owned by Hogan Bros., of New Orleans, La. This 4-in-1 unit is seen working on the Crescent-Airline Shopping Center project, where it performed miscellaneous dirt-moving, leveling, toting, lifting and handling.



● The same clam is taking a grab on a roll of wire.



● Tractor-mounted clam totes a load of heavy precast concrete structural units.

Sign Cleaning Costs Cut In Texas Department

Periodic cleaning of roadside signs has been reduced to a cost of about 15c per sign in the Fort Worth district of the Texas Highway Department.

So reports Joe N. Bingham, district maintenance engineer, in a news release from Work Chemical Products Company, maker of the new compound employed.

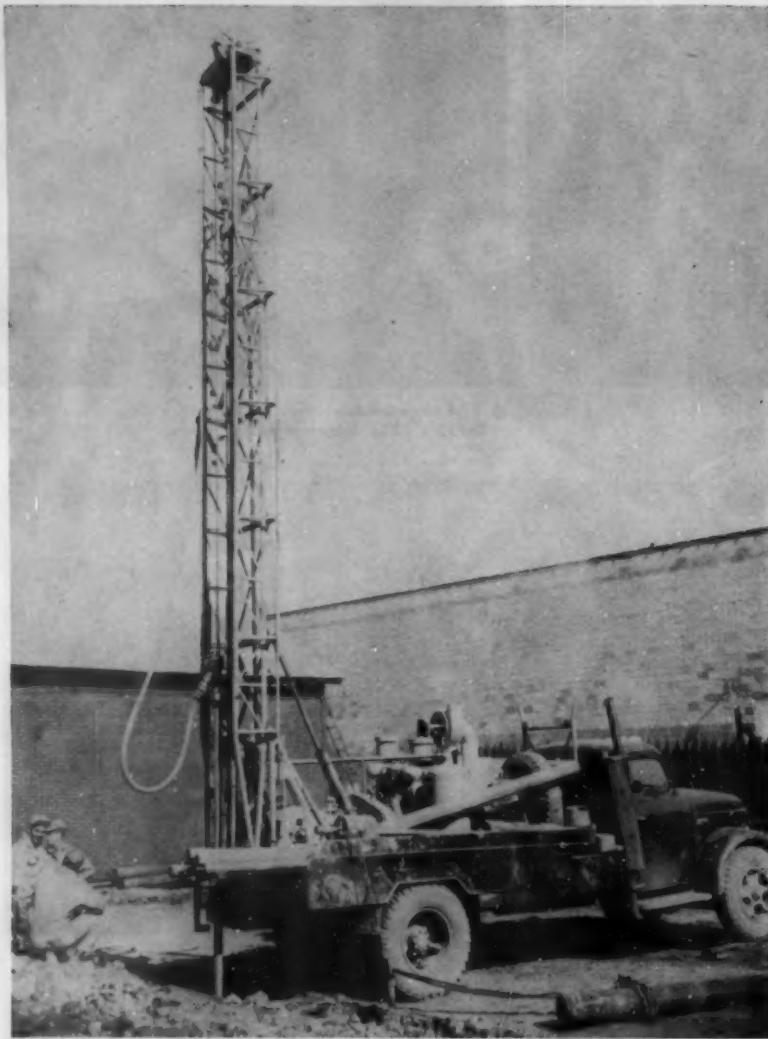
Previously the signs were cleaned up each year by soap and brush, requiring several months of time, whereas today six weeks does the job at a reported saving of thousands of man hours. About 14,000 signs are in use in the state highways of the Fort Worth district.

The requirements for a sign-cleaning compound by the highway department were that the compound should work with the hard

water of the area, should not be harmful to the skin of the workers, and should loosen dirt, grease and grime without hurting the signs. Two men now do all the sign cleaning for this district, one driving a pickup truck, while the other squirts the compound from a 50-gallon tank.

Drill Unit Handled Three Jobs on One Project

An unusual construction job that permits a Davey M-8A rotary drill to function alternately as drill, crane and pile-driver was handled recently by Hoffman Bros. Drilling Co. in Punxsutawney, Pa.



• Davy M-8A drill on Hoffman Bros. Drilling Co. job in Punxsutawney, Pa.

In addition to drilling 6-in. building support holes, the M-8A is used to lift piling into position and then to drive it into place. The latter operation utilizes a large circular weight welded to the upper end of 15 ft. of 3-in. pipe. This is lifted by the draw-works of the drill above the center of the piling and then released. The resultant impact, when repeated, supplies sufficient force to firmly seat the piling.

The drill used is also adaptable to using both compressed air and high pressure water for drilling.

• The Kansas Highway Commission's shop and district office facilities are being improved and extended with an expenditure of \$750,000. This is in addition to shops which have been added in 26 of the state's 27 districts in a recent period.

Electronic Computer Placed in Colorado Department

The Colorado State Highway Department has joined the ranks of state departments which have installed electronic computers. An IBM Model 650 unit has been put into action in Denver.

By order of administrative engineer Charles E. Shumate, the machine will at first be devoted to necessary cost accounting and preparation of payrolls. Meanwhile the engineering staff is investigating question programs which can be used in the computer. One of the first uses will be that of making earth work computations and figuring out surveying problems. Other uses will be the calculation of bridge stress and roadway grade computations and for roadway projection work.

New Publications

(Continued from page 150)

The Standard Specifications book (FP-57) is available for purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at \$2.00 a copy. Please do *not* send orders to the Bureau of Public Roads.

FIRST PROGRESS REPORT OF THE HIGHWAY COST ALLOCATION STUDY. Prepared by the Bureau of Public Roads under Section 210 of the Highway Revenue Act of 1956 and published as House Document No. 106, 85th Congress. The 131-page report is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 35c a copy.

The publication includes extensive background information on highway taxation and financing, a discussion of methods of attack on the tax-allocation problem, and a report on planning and progress of the cost allocation study to date.

MOMENTS IN SIMPLY SUPPORTED SKEW I-BEAM BRIDGES. By T. Y. Chen, C. P. Siess and N. M. Newmark. Bulletin No. 439, University of Illinois Engineering Experiment Station, Urbana, Ill. Price \$1.00. Bulletin contains an analytical study of a bridge consisting of a uniform thickness concrete slab over I-beams parallel to the direction of traffic.

STATIC STRENGTH OF RIVETS SUBJECTED TO COMBINED TENSION AND SHEAR. By William H. Munse and Hugo L. Cox, University of Illinois Engineering Experiment Station, Bulletin No. 437. Price 45c. Address station at Urbana, Ill.

TORSIONAL PROPERTIES OF STEEL AT HIGH RATES OF STRAIN. By Paul G. Jones and Thomas J. Dolan, University of Illinois Engineering Experiment Station, Bulletin No. 438. Price 35c. Address station at Urbana, Ill.

NUMERICAL RATINGS FOR ARIZONA HIGHWAYS. Prepared by the Arizona highway department, Division of Economics and Statistics, in co-operation with the Bureau of Public Roads. Address Phoenix, Ariz.

BUSINESSMAN'S GUIDE TO THE ROAD PROGRAM. Booklet designed to help business and organization leaders become better informed on the national highway program, tells how they can help insure sound expenditure of their tax dollars in their local communities.

The booklet is written with the help of 17 nationally prominent highway authorities who have answered the questions most frequently raised at recent conferences of business leaders sponsored by the Chamber of Commerce of the United States. The booklet is of special interest to C. of C. officials; members of highway committees; city, county and state officials; legislators, engineers and planners, educators and businessmen. Price \$1.00 per copy, with quantity rates quoted on request.

Address Gerald W. Collins, Manager, Transportation and Communication Department, Chamber of Commerce of The United States, 1615 H Street, N. W., Washington 6, D.C.

SMOLEY'S HANDBOOKS. A revised and extended edition of these handbooks has been issued by C. K. Smoley & Sons, Inc., Chautauqua, N. Y.

The series includes Parallel Tables of Logarithms and Squares (\$6.00); Handbook of Logarithmic-Trigonometric Tables (\$1.50); Parallel Tables of Slopes and Rises (\$6.00); Segmental Functions (\$5.00); Four Combined Tables (the above four books in a single volume), especially edited and expanded with over 350 pages of new material (\$12.00); Three Combined Tables (the first three books listed above) \$10.00.

SPECIFICATIONS FOR PRE-TENSIONED PRESTRESSED CONCRETE, Revised Edition 1957 (tentative). Published by the Pre-stressed Concrete Institute, 3132 N.E. Ninth Street, Fort Lauderdale, Fla. Price 50c per copy for PCI members, \$1.00 per copy for non-members. Quantity prices on request to the Prestressed Concrete Institute.

HIGHWAY ADMINISTRATION. Bibliography 19, price \$1.00. Address the Highway Research Board, 2101 Constitution Ave., Washington, D. C. Contains cross-indexed compilation of 362 article references on the subject as compiled by the board's Committee on Highway Organization and Administration.



CARAVAN AXLES

rugged Trouble Free mobility

Caravan axles are your guarantee of "Rugged, Trouble Free Mobility" on rough construction terrain and for positive high speed trailing. Your men in the field are assured of dependable performance when their mobile equipment is mounted on quality-built axles by UNITED.

Caravan axles are available as single axle, two wheel assemblies and as four-wheel running gear. Equipped with automotive type steering mechanism, adjustable camber, caster and toe-in. Designed and engineered for construction, military and industrial equipment with a capacity up to 20,000 pounds.



*Literature and
individual counsel
are available
upon request.*



THE UNITED MANUFACTURING CO.

3637 WEST 56TH STREET • CLEVELAND 2, OHIO

... for more details circle 340, page 16

GIVE OUTPUT AND PROFITS A JET-ASSISTED **Marionair** CONTROL

USED ON ALL DIESEL POWERED MARION MACHINES

The hardest working air in the world passes through Marionair Controls. It knocks the wind out of the toughest jobs — and finishes most of them in a breeze. It's like harnessing a hurricane . . . taming a tornado . . . turning their energy into job profits.

Why Air Control — Air is safe: no shock or fire hazard. Air is simple, without costly and complicated linkage. No return lines needed. Operating men understand it easily.

Why MARIONAIR Control — Marion went all the way with air control as early as 1940; Marion has devoted 16 years to its refinement and perfection. Marion has the world's broadest line of air controlled excavators and cranes. Marion makes air do more.

Easy Does It — Marionair Control gradually and smoothly exerts from 0 to 90 or more pounds of pressure on the clutches, in direct proportion to hand pressures on the controls. It is easy to use, easy to service.

Efficiency Goes Up — Operators remain fresh and alert all shift long because Marionair Control virtually eliminates operator fatigue. "Feel of the load" is retained, helping the operator to work confidently and efficiently.

Easier Maintenance — Its simplicity means fewer maintenance problems. No rods, levers and pin connections to become loose with wear.

Smooth Performance — A smooth, positive flow of power to the clutches, without jerkiness or delay. No need for a fine sense of timing to put the dipper, bucket or crane load where you want it.

FIELD PROVED FOR 16 YEARS

Marionair Controls have been proved by 16 years on-the-job . . . by all types of service and working conditions. Marionair Control has been integrated into the basic design of machines. Marion has made fullest possible use of compensating valves for gradual, smooth engagement of friction clutches . . . poppet valves for jaw clutches and other "on or off" controls. Marionair Control puts full power at the operator's finger tips . . . gives him instant, accurate control of the load. Put Marionair Control's "muscles of air" to work on your jobs. Let a compressor—not your operator—do the huffing and puffing.

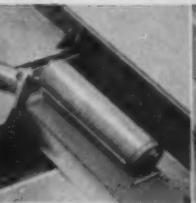
CRANE EXPERTS: HEAR THIS!

When Marionair Control is teamed with big, smooth Marion clutches, a torque converter and a foot accelerator, you are ready for the most ticklish precision crane jobs involving the lightest or heaviest loads. One foot on the accelerator can lift the load, lower it, inch it into position or hold it in one position.

MARIONAIR CONTROL STEP-BY-STEP



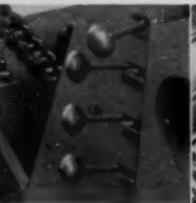
Dependable, kingsize compressor, operated by power unit through V-belt drive, has capacity to maintain full pressure in extremely fast cycles; its operation is automatically controlled.



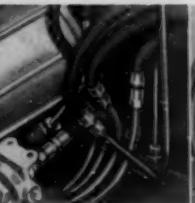
Pressure reservoir tank, in out-of-the-way pocket of upper frame, stabilizes pressure entering the lines; fitted with safety release valve and outlet for use in draining excess condensate.



Compensating valves "meter" air to cylinders or expanding tubes controlling friction clutches. Operator retains feel of the load, gets smooth, gradual engagement or fast, crisp cycle time.



Poppet valves govern operation of jaw clutches and other "on-or-off" controls. Operator's wrist movement produces instant, positive action. Controls conveniently grouped on panel in cab.

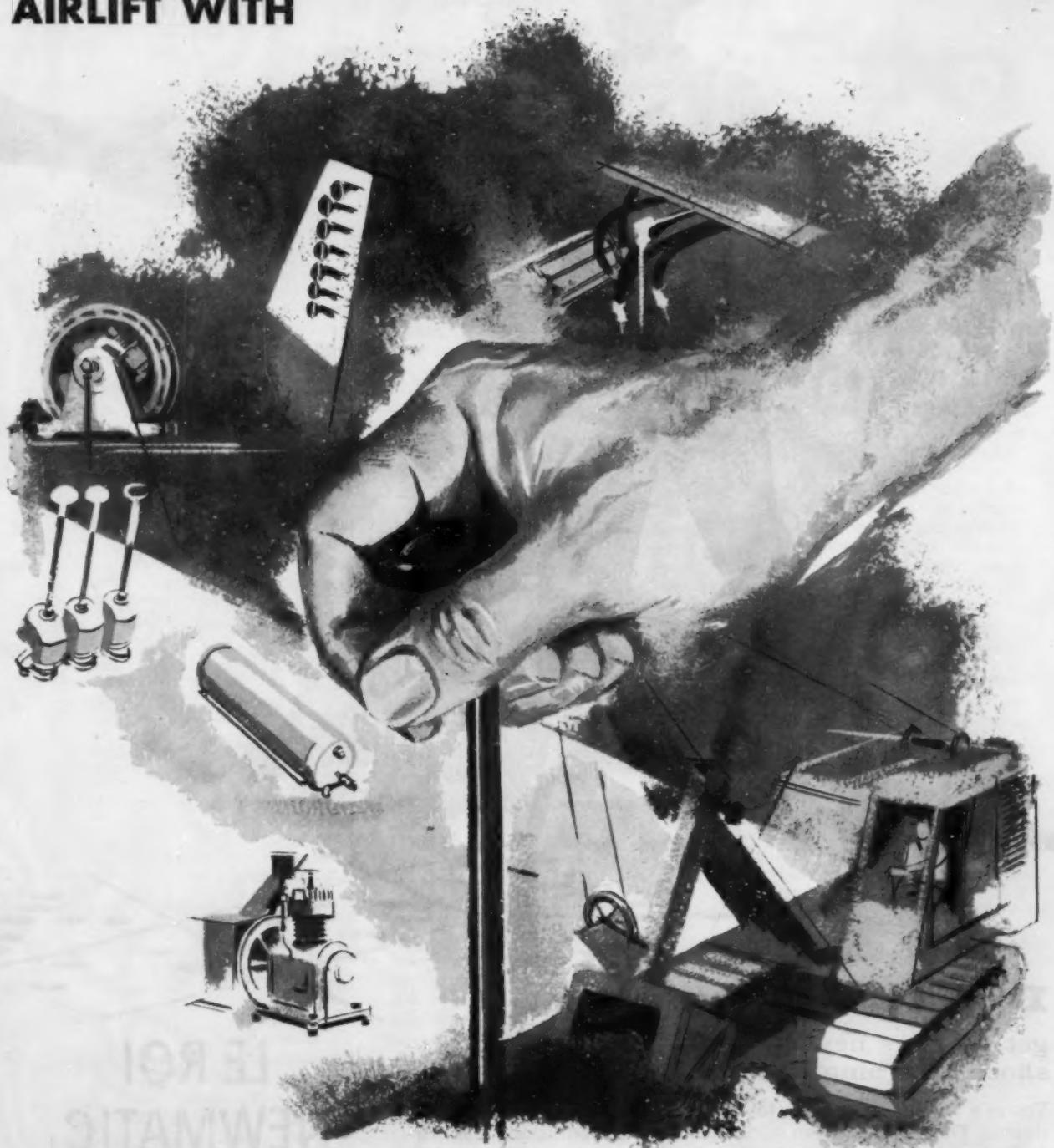


Strong copper tubing and heavy-duty flexible hose carry air pressure to all parts of machine; replace conventional levers, rods and pins. Operators like simplicity and reliability of air.



Marionair Control engages this clutch in direct proportion to the speed and firmness of the operator's hand pressure on control lever. The response is uniform, consistent and dependable every time.

AIRLIFT WITH



POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

... for more details circle 310, page 16

ROADS AND STREETS, June, 1957



Don't play games...

get Le Roi's new
shock-absorbing rock drills!

You're a winner every time, too, with Le Roi's new shock-absorbing sinkers. They take away an amazing 55% of the punishing kick normally transmitted from the hammer to the operator—yet never lose an ounce of rock-shattering impact. This makes drilling so easy, we don't know how your operators can keep from playing tic-tac-toe.

See these new easy-handling long-life rock drills at your local Le Roi distributor. He's got the new Model H10, H111, and H12 sinkers in stock right now . . . available for fast delivery. Or write Le Roi Division, Westinghouse Air Brake Company, Milwaukee 1, Wisconsin.

LE ROI
NEWMATIC
AIR TOOLS



PORTABLE AND TRACTAIR AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

Engineering Digest

by John C. Black

Lab Study of Interaction of Subgrade and Base Course

A Purdue student thesis reports the results of a laboratory study initiated to investigate the effects of repetitive loading on selected combinations of subgrades and base courses. Two subgrades were studied: a highly plastic clay, derived from the weathering of limestone rock and pedologically classified as a Frederick soil; and a clay of medium plasticity obtained from the B horizon of the Wisconsin Drift, classified as a Crosby soil. Two gradations of base course also were studied, both of which were well-graded mixtures of glacial gravel from Lafayette, Ind., with a $\frac{1}{4}$ -in. maximum size. The first of these, designated as "open-graded," had no material passing the No. 80 U. S. sieve; the second, referred to as "dense-graded," had 7 percent by weight passing the No. 200 U. S. sieve.

A description of the compressed air actuated repetitive loading equipment is included. Two types of loading were utilized: single-acting, in which the loading piston periodically applied loads while continually remaining in contact with the base course, and double-acting, in which the loading piston returned to a zero position after each load application, hence had a length of stroke which increased as the deflection in the base course-subgrade system increased. Forty thousand load repetitions were applied to each specimen at intervals of 4 sec., with each load sustained for 0.3 sec.

• The laboratory study was designed as a complete factorial experiment to investigate at two levels the factors of subgrade type, base course type, subgrade compaction, base course compaction and applied pressure. The subgrade was compacted statically in 7-in. I.D. lucite cylinders to 95 percent of the unit weights obtained in the standard and modified AASHO compaction tests, while a combination of vibration and dynamic compaction was used to place base course samples on the compacted subgrade at relative densities of 0.75 and 0.95. Both

double-acting and single-acting tests were performed on combinations of subgrades and base courses at 10-psi and 40-psi applied pressure. Similar tests were also performed directly on the subgrades and on the base courses.

Open-graded base courses were found generally superior to dense-graded bases; samples with the more permeable base course had a smaller total deflection and a lesser weight of pumped material. Similarly, combinations with the more plastic Frederick subgrades were found to perform slightly better than those with the less plastic Crosby subgrades. Increasing the compaction of the subgrade was found decidedly beneficial for all samples, although an increase in the base course compaction appeared to have little effect. An increase in pressure accelerated the onset of pumping and increased its severity.

By John Alan Havers, Ph. D. Thesis, Purdue University (Lafayette Ind.), June 1956; *Highway Research Abstracts*, April, 1957.

How Transverse Framing Affects Bridge Design

"Rigid transverse framing of girders affects the distribution of the loads placed at the framed system, designated a grid. The transverse framing may be a slab or it may consist of one or more individual cross frames. The girders may have negligible torsional rigidity, or they may be rigid torsionally. The bridge design specifications of the American Association of State Highway Officials (AASHO) do not consider these structural characteristics which significantly affect the distribution of the live load between the girders. They assign live loads to the girders according to their spacing, irrespective of the rigidity characteristics of the grid. This practice results in different factors of safety for bridges of various arrangements and materials, generally penalizing monolithic construction and long-span girders."

The above introduction is followed by calculations of load dis-

tributions by various methods and for different types of bridges. Formulas, diagrams and tables are given.

"Grid Bridge Design," by Louis Balog, Consulting Engineer, Binghamton, N. Y., *Civil Engineering, American Society of Civil Engineers*, 33 West 39th St., New York 18, N. Y., February 1957 (Price 50 cents).

More Coordination Needed in Soil Testing

Engineers are too prone to accept "standard" soil tests as decisive and dependable indexes of soil capacities in the design and construction of foundations and earth works within practical limits. The complicated net effect of the numerous special characteristics of a soil and its environmental conditions require that each case be studied independently and rationally on the basis of all factors.

"The purpose of this paper is to suggest fundamental ideas, conceptions and approaches and to direct thought toward higher scientific levels." A list of eleven references is included. Length of the article, 2½ pages. The author is professor in the department of Civil Engineering and Engineering Mechanics of Columbia University. ASTM Committee D-18 on Soils for Engineering Purposes has supported his concern and has given its endorsement to the author for publication of the paper.

"Judgment and Environment Factors in Soil Investigations" by Donald M. Burmister, *ASTM Bulletin, American Society for Testing Materials*, 20th and Northampton Sts., Easton, Pa., October, 1956 (price 50 cents).

Access Control in 48 States

A table indicating the existence or non-existence of statutory authority to control certain features of access to highways, such as authority to construct frontage roads in each of the 48 states. Twelve features are covered. In addition, 17 states are reported as having declarations of legislative policy and 40 as providing definitions of terms.

"Elements of State Statutory Authority for Control of Access—1956," *American Highways, American Association of State Highway Officials*, 917 National Press Building, Washington 4, D. C. October, 1956 (Price 50 cents).

What's New In Equipment and Material

Reader Service Coupon on Page 16.

services in the 30 to 50-megacycle band such as police, ambulance, fire, utilities, petroleum, trucking, towing and forestry.

The model F can be operated directly from the regular auto radio antenna without affecting the operation of the auto radio, thus eliminating the need for a separate antenna. An effective squelch circuit, adjustable from the front panel, is included for complete quieting of the receiver between calls.

For more information circle 106 on Service Coupon Page 16 and mail now.

Multiple Reel Trailers

A complete line of safety reel trailers, including models handling from one to four reels at a time, has been introduced by the Ottawa Steel division of L. A. Young Spring & Wire Corp., Ottawa, Kans., to complement their line of construction and material handling equipment. Multiple reel models with lifting capacities of 3500 lb. per reel, have been designed to handle all sizes of spools of electric cable.



Ottawa Cable Reel Trailer

Pickup arms lower to 12 in. above ground to handle spools as small as 24 in. and up to 54 in. in diameter without special attachment. A single reel model handles large reels of telephone cable.

For safety, an electric winch prevents any possibility of overloading the lifting cable; reels roll freely, with no possibility of dropping a reel from top rails, even if rolled crooked; spindle bars lock safely into place with automatic-locking ball lock pins; reel shaft cannot slip or jump out of place and drop reel while being hoisted, even if the operator should fail to close bearing caps. Disc-type friction brakes on each reel prevent overspin and free wheeling and provide controlled friction for tension stringing. A precision tensioning device is also available. No lifting is required by the operator. Reels are simply rolled in between lowered arms and lifted by push button controlled electric winch (or hand winch when no power is available).

For more information circle 107 on Service Coupon Page 16 and mail now.

draulic pedestals at each corner lift the finisher off forms without blocking or need of special tools. Speed of operation is stressed by the manufacturer. The large float is 12-ft. long and has up to 12-in. lag for fast working under all conditions. Crown adjustment is easy. Removable side rails permit collapsing machine for trailing on the transportation wheels or truck loading.

For more information circle 109 on Service Coupon Page 16 and mail now.

New Telescopic Hoist

The HMT 63-102 and HMT 63-117 telescopic hoists put out by The Heil Co., Milwaukee 1, Wis., have greater lifting capacity for dumping, it is said. The weight savings have been achieved without sacrifice of capacity by the use of special alloy steels, manganese bronze sleeve bearings and higher designed hydraulic pressure systems. As an added feature, these hoists incorporate the new SAE "O" ring, plus 37-deg. flare SAE fittings in hydraulic pressure lines.



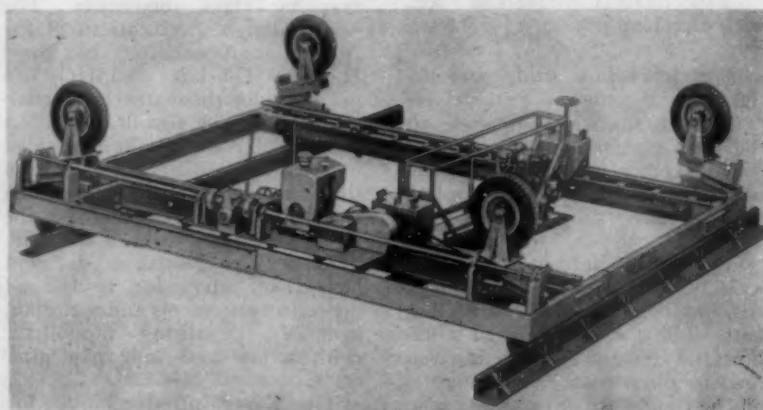
Heil Dump Body Hoist

Improved Float Finishers

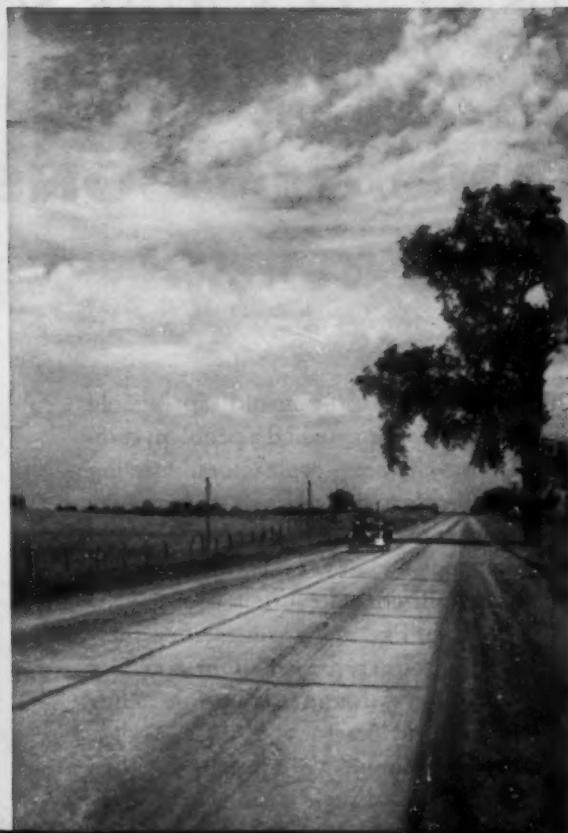
A new line of Rex longitudinal float finishing machines in models from 10-ft. to 32 ft. working widths and offering numerous design and operating advancements is announced by Chain Belt Co., General Road Machines division, Niles, Ohio. Powered-frame widening is one of the major improvements. This optional feature permits nonstop changes in widths to speed work and reduce costs in interchange and tapered-lane work.

For rapid, easy portability, transportation wheels are also available. Hy-

A new diaphragm-type pneumatic pump for high head work has been (Continued on page 173)



Chain Belt Longitudinal Finisher



There's Pay Dirt in Mud Roads When You Pave with *SOIL-CEMENT*

Taxpayers and motorists strike real pay dirt when old mud roads and streets are transformed into soil-cement paving. The old mud itself becomes all-weather paving simply by mixing in small measured amounts of portland cement and water.

Soil-cement paving is low cost because it requires less material and hauling. It utilizes the soil already on the road site. This usually constitutes about 85 per cent of the necessary material. Normally only cement, water and bituminous surface material need be trucked to the job.

Soil-cement paving is also low cost because it is *fast*. Regular construction and maintenance crews quickly can be taught the simple methods of building dependable, long-lasting soil-cement

pavements. And needed construction equipment is either already on hand or can be readily obtained.

Soil-cement is not only low cost but also *easy* to build. Scientific testing methods in the laboratory and on the job remove all the guesswork and make paving procedures entirely foolproof.

And, more pay dirt, records show that maintenance costs for soil-cement paving are extremely low.

Why not make this "pay-dirt" method the basis of a dependable secondary road and residential street paving program? Send for free illustrated bulletin on soil-cement road and street construction and maintenance. This literature is distributed only in the United States and Canada.

P O R T L A N D C E M E N T A S S O C I A T I O N
DEPT. A 6-28, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

... for more details circle 319, page 16

ROADS AND STREETS, June, 1957

Costs of city work seem too high?

LOOK HOW

SANGAMO CONSTRUCTION CO. CUTS THEM

This well-known 30-year-old Springfield (Illinois) firm, a year ago, had a problem common to most city-area contractors. Moving costs and traffic slow-downs were taking much of the profit out of their municipal work. Small, extra, one-day or weekend jobs, which *could* have built income, often couldn't be handled because, like many contractors, their equipment was either too small or too big. Sangamo, however, found a solution. They bought Michigan Tractor Shovels. Today, their \$3,000,000 annual volume is *largely* in city work and *three* of their busiest, most profitable machines are Michigans.



**Drive, turn non-stop
on narrowest city streets**

All these units can be on their way to any kind of loader job in minutes. "These rigs go anywhere," says Clyde Turner, one of Sangamo's job superintendents. "They can run three or four blocks, through auto and truck traffic, in a minute or so. Twenty-seven miles takes only an hour. Rubber tires don't tear up asphalt or oil-mat pavement. They can even go up on a sidewalk without breaking it or the curbing. And our Model 75A's (which are 6' 8" wide and 16' 10" long) can turn around non-stop on the narrowest city streets."



**Does job of bigger machines
setting 12 inch sewer pipe**

Often, one of the Michigans is assigned to a major job where maneuverability is a vital factor in speeding completion. Above picture shows typical task of this type—laying eight miles of 8, 10, and 12-inch sewer pipe for the city of Decatur (Illinois). Daily—almost hourly—this Model 75A shuttled between *three* crews. Tasks included pushing spoil away from trencher . . . back-filling . . . transporting and laying pipe. At times, it set manholes weighing 1200 to 1500 lbs per ring section. Biggest advantages proved to be speed (a typical half-mile trip took 75 seconds) . . . rugged construction (in a summer of work, no time was lost from the job for repairs) . . . planetary axles (which eliminated all axle breakage despite rugged lifting demands).



Carries 1800 lb water main section

Bigger loads have been no problem for the Michigans, either. Above, the second of Sangamo's 80 hp Model 75A's carries an 1,800 lb, 18 ft section of 20 inch water main. This unit *can* lift 8,000 lbs while standing still . . . can carry 4,000 lbs at 4 mph.



Clears, loads 1,000 yards of rubble in 1½ days

Sangamo's third Michigan Tractor Shovel, a 95 hp, 2 yard Model 125A, also handles assignments where speed is important. Here it's on a historical job in Springfield—clearing the wreckage of Illinois' first governor's mansion to make way for a parking lot. Entire 1,000 cubic yards of rubble and dirt was piled and loaded out in 1½ days. Sangamo Construction bought this machine, their first Michigan Tractor Shovel, after having it demonstrated (to quote Company President, Bill Kewley) "on the toughest tractor shovel work we could find—digging up wet rocky ground to improve drainage around a Springfield sewage treatment plant. Later," Kewley continues, "it proved so handy and so dependable, all our crews wanted one. So, in 5 months, we bought our second Michigan, and 3 months later, our third."

... for more details circle 262, page 16



Full buckets are the trademark of all Sangamo's Michigans. Here the Model 125A, bin-storing hot mix material, carries *more* than its rated 2 yard capacity. Unexcelled breakout force, low-level tipback, and low-level-carry result in the delivery of big loads every time, the operator says.

Stockpiling gravel is another job for the busy Model 125A. While at this city-located yard, rig sometimes loads trucks and railroad cars, feeds the crusher, does cleanup. Its standard 2 yard bucket, incidentally, is interchangeable with either 1½ or 2½ yard buckets.



The model 75A's standard 1½ yard bucket interchanges with ¾ and 2 yard sizes. Both models can also be equipped with crane hooks, fork lifts, backfiller blades, scarifiers and root rakes. For small jobs you can get a Michigan Model 12B with 6, 10, 16, 20, or 27 cubic foot capacity . . . for big jobs you can get a Michigan Model 175A with 1½, 2½, 2¾ (standard), 3¼ or 5 cubic yard capacity. For help in determining which of these four models, or which of their 35 different buckets and attachments, *best fits your needs*, ask one of our job study engineers to study your layout. Feel free to call or write us any time for this service. It's free, of course and realistic . . . and will put you under no obligation whatsoever.

Michigan is a registered trade-mark of

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2497 Pipestone Road
Benton Harbor 27, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario



Part of the equipment used in the excavating operation at Pima Mine, Arizona. Operations will be completed about January, 1957.

STOODY HARD-FACING in one of the WORLD'S LARGEST OVERBURDEN STRIPPING PROJECTS

A huge stripping operation is in progress a few miles south of Tucson, Arizona, at the Pima Mine where Utah Construction Company is moving 6,000,000 cubic yards of overburden, including 600,000 yards of waste rock, to expose the copper ore deposit 210 feet below the surface. The job was begun in October of 1955 and will probably be completed by January of 1957.

An unusual feature of this project is the method of moving the overburden, a highly abrasive alluvial soil. Instead of the usual blast hole equipment, shovels and dump trucks, the job is primarily handled with rippers and

scrapers. After the rippers make a pass, scrapers pushed by crawlers pick up the loose material and haul it to a fill. The equipment inventory includes a D9 Cat ripper, an HD21 A-C ripper, 10 MRS scrapers, two Cat 12 motor graders, six A-C and two D9 Cat pushers, four LLD 30-yard trucks, a Marion 7-yard shovel, a Michigan dozer and two water wagons.

One out of three shifts is devoted to maintenance and repairs. Hard-facing



RIPPER TEETH—are hard-faced with two close, parallel beads of Stoody 100 across the point with an open-bead cross pattern up the tooth face. Points also receive a bead of Tube Borium on the under sides.



SHOVELS AND TEETH—at noon and at the end of the second shift tooth points are touched up with Tube Borium. Three stringer beads on the tooth are equivalent to a full inch of bare tooth wear. With this treatment teeth usually last six to eight shifts. Repointer bars are welded on worn teeth, hard-faced semi-automatically with Stoody 100 and finished off with Tube Borium.

of many pieces of equipment is speeded up by the use of the semi-automatic welder applying Stoody 100. On ripper and bucket teeth which are subject to severest wear, Stoody Tube Borium is applied manually as a final overlay.

Hard-facing methods used here are



SIDE BLADES ON LOADERS—are subject to severe wear from "scooping" action. Stoody 100 holds it in check.

described in the Stoody Guidebook and the folder on semi-automatic wires. See your Stoody dealer for a copy of this literature (check the yellow pages of your phone book) or write direct.

STOODY COMPANY

11925 East Slauson Avenue,
Whittier, California

... for more details circle 329, page 16
ROADS AND STREETS, June, 1957

What's New in Equipment and Materials

(Continued from page 168)

announced by the Layton Co., Inc., 4757 S. Whitnall Ave., Cudahy, Wis. It is designed for construction, mining and manufacturing operations, will pump with a head of 100 ft. or more, can operate in a shallow trench and is said to be well suited for operation and portability along the top of a trench. One man can move it as work progresses. Operation by air only assures safety in enclosed spaces.

This new pump ejects fluids with 60 percent solids and highly abrasive liquids. Fluids and materials are bypassed from suction line directly into discharge outlet and do not contact working parts. It is 22 in. high, 12 in. in diameter and weighs 65 lb.



Layton Diaphragm Pump

For more information circle 111 on Service Coupon Page 16 and mail now.

Crawler-Mounted Finisher

Barber-Greene Co., Aurora, Ill., has announced a new crawler-mounted asphalt paver which embodies four new improvements said to give it faster laying speed, faster travel, lower maintenance cost and increased power. Designation: model 879-B finisher.

The improvements include a new transmission for both higher operating and travel speeds—12 forward speeds, with maximum operating speed of 64 ft. per minute and travel speeds to 3 1/4 mi. per hour; a new high speed tamper which permits faster laying speeds and reduces maintenance costs; new crawlers with precision-drilled pads and larger pins, further reducing maintenance costs; a new power unit developing 20 percent more power.

These improvements, as well as

many which preceded them, can be incorporated into older model 879-A Barber-Greene machines. The necessary parts are now available in kit form for field conversion, with each modification handled separately.



Barber-Greene Finisher

For more information circle 112 on Service Coupon Page 16 and mail now.

Industrial Loader Attachments



Ottawa Steel Clamp Fork

A pallet fork and a pulp wood clamp fork have been designed to interchange with the bucket and increase the versatility of industrial front end loaders made by Ottawa Steel division, L. A. Young Spring & Wire Corp., Ottawa, Kans.

The pulp wood clamp fork is used to load, transport and stack logs, lumber, or any material requiring a hold-

down device. The hydraulically controlled clamp prevents loss of load when traveling over rough terrain.

The pallet fork is used for handling all palletized materials such as concrete blocks, brick, lumber, building material and pipe. It is stated that the change from bucket to attachment can be made in 15 minutes.

Pallet forks and clamp forks are made in 30, 36, 42, 48 and 54 in. lengths, and carriage widths of 48 in. and 64 in. Other attachments are available.

For more information circle 113 on Service Coupon Page 16 and mail now.

Triple Tamper with Line Oiler



LeRoi Triple Tamper

A new triple tamper, with built-in line oiler to assure positive oil feed while operating, has been introduced by Le Roi division, Westinghouse Air Brake Co., Milwaukee 1, Wisc. The new tamper, the "OT11," has a handle grip throttle valve incorporating a safety snap action which shuts off the air supply when the lever is released. A plug type throttle is available.

Gratings at Railroad Crossing



After four years, this railroad crossing grating at Oakmont, Pa., has continued to present no maintenance problem at a location which was once a very rough and troublesome part of a busy arterial. Gratings are by Blaw-Knox.

The tamper's line oiler is of non-spurging design with adjustable regulator. Plates prevent excessive oil foaming. The 1/4-quart capacity allows a full 8-hr. day of operation with one oil filling. Air hose connects to the back of the right handle grip, preventing air line from interfering with the operator or tamper butts. The throttle valve is also located on the right handle grip. The weight of the unit, 114 lb., is distributed to utilize the power stroke of each tamper to the full and to make handling easy. The tamper lifts and carries its own weight, making it only necessary to guide it while in operation. Adaptability is noted for narrow trench, close foundation or abutment tamping. The three tamper butts cover a 70-sq. in. area.

For more information circle 114 on Service Coupon Page 16 and mail now.

Bituminous Seal Surfacer

Surface cost application of bituminous material and chips in one operation with one piece of equipment and a single operator, is accomplished



Wright "Bit-Paver"

by the "Bit-Paver," a product of Wright Industries of Lansing, Mich. It is stated that the design is based on experience with a machine used by Portage Bituminous Co., Akron, Ohio, in the resurfacing of 2000 miles of road during a 7-year period.

Tank capacity of the "Bit Paver" is 2000 gal., with heating by butane gas, and temperature control to 500 degrees. Spray bar is full-circulating; chip application is controlled by flow gate; separate tachometers for bitumen and chips govern the application rates. Width of spread is 9 to 15 ft.

For more information circle 115 on Service Coupon Page 16 and mail now.

Improved Utility Ditcher

An improved Gar Wood-Buckeye



Gar Wood-Buckeye Ditcher

model 403 utility ditcher that incorporates foot pedal steering, shiftable spoil conveyor and new hydraulic controls has been announced by Gar Wood Industries, Inc., Wayne, Mich.

Specially designed for "stop and go" utility ditching, the 403 is now equipped with a new hydraulic pump that provides full-time hydraulic pressure for instant control of the digging boom. The need for a hoist-clutch is eliminated.

A new foot-pedal steering arrangement replaces hand levers, providing the operator with greater control and accuracy, it is claimed. A slip-clutch protects the machine from overloads. No tools or complicated adjustments are required to shift the spool conveyor to right or left.

The model 403 has a maximum digging capacity of 5 ft. deep and 12 in. wide, or 4 ft. deep and 16 in.

For more information circle 116 on Service Coupon Page 16 and mail now.

Light Truck "Anniversary" Line

Fifty years of motor truck production is being marked by International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., with introduction of a distinctive new "Anniversary" line that ranges from a half-ton series at 4,200-lb. gross vehicle weight to the heavy duty cab-forward 6-wheel ACF-180 series at 33,000-lb. GVW.

The model A-120 (4x4) "Travelall," rated at 7,000-lb. GVW, is powered by a 141 hp International Black Diamond



International "A-120" model

engine with 154-hp 264-cu. in. engine optional. Wheelbase is 114 in. Streamlined body contours and low height are features.

For more information circle 117 on Service Coupon Page 16 and mail now.

Rippers for Varied Conditions

A new line of rippers for rock, frost, hardpan, asphalt and other tough materials was announced recently by E. A. Rogers Co., 149 E. Main St., Grass Valley, Calif. These rippers are made in types and sizes to fit any tractor or blade and may be used singly or in multiple.



Rogers Rippers

For more information circle 118 on Service Coupon Page 16 and mail now.

Airfield Vacuum Cleaner

The Fruehauf "Cole-Vac" airfield vacuum cleaner consists essentially of a commercial truck chassis on which is mounted a vacuum system with provisions for picking up, separating and retaining the debris picked up from airfield pavements. The unit has two gasoline engines, one to propel it and the other to power the vacuum system. It is operated by one man from a cab high at the rear of the unit which gives good vision in all directions. The truck chassis is reversed to facilitate placing the nozzle intake ahead of the vehicle and to obtain high maneuverability of the nozzle end by the use of rear wheel steering. The nozzle can be raised by hydraulic action to give greater road clearance when needed. The dual debris hoppers, one on each side of the vehicle, can be emptied by hydraulic controls located in the operator's cab.

It is stated that the special air agitation of small particles and the agitation of large particles resulting from striking the impact agitator assist the nozzle suction in picking up all forms of debris ranging from sand to 2-in. diameter rocks and 1-in. diameter steel bars 3-in. long. Heavy and light objects are separated in the storage hoppers.

The "Cole-Vac" was designed and (Continued on page 179)



DRIVE FORM PINS FOUR TIMES FASTER

with the light-weight I-R Pin Driver

An Ingersoll-Rand PB-59 Paving Breaker equipped with a pindriving fronthead drives form pins as fast as you can set 'em! One man with a PB-59 can drive pins in from 5 to 10 seconds each—easily keeping up with the pin setter. This air-powered tool actually speeds up form-pin driving at least four-to-one.

Equipped with an easily-interchangeable Paving Breaker fronthead, the 40-lb. PB-59 has the right weight and power for a wide range of demolition, digging and tamping jobs. For complete information on the PB-59, as well as the many other items in our complete Paving Breaker line, see your I-R man or send for Bulletins 4126 and 4127A.

PB-59
PAVING BREAKER
WITH
PIN-DRIVING
FRONTHEAD



CONTRACTORS'
COMBINATION

Ingersoll-Rand
11 Broadway, New York 4, N.Y.

THE BEST AIR EQUIPMENT FOR BETTER HIGHWAYS

... for more details circle 352, page 16

ROADS AND STREETS, June, 1957

For operating ease



The Gar Wood-Buckeye 308 Ditcher is built for tough jobs. Power for traction and digging is taken directly from the engine transmission through separate output shafts. No open jack-shafts to waste power. More anti-friction bearings mean less wear . . . less power lost to friction. The result is more power where it pays . . . at the digging wheel!

Gar Wood Excavators give you Independent Travel as standard equipment! Operator can hoist or swing while moving. Direct manual controls make for speed and accuracy. Power-actuated drum clutch reduces operator fatigue. Compact design of machinery deck simplifies maintenance.

GAR WOOD

PLANTS IN WAYNE AND

ROADS AND STREETS, June, 1957

that boosts production, go Gar Wood-Buckeye

You pay for power . . . so choose a ditcher that lets you *use* it! Simplified controls on Gar Wood-Buckeye ditchers put power to work with *less operator effort*. The result: greater production, more ditch per dollar.

Here's why Buckeyes are easier to operate: "Live" hydraulic wheel hoist gives you quick, accurate positioning of the digging wheel. Hydraulic conveyor drive provides cushioned power with three discharge speeds in either direction . . . adjusts instantly to handle any

volume of spoil. Wheel hoist and conveyor drive operate independently of each other . . . no need to stop digging-wheel or forward travel. All controls are grouped together for operator convenience.

What it means to you is smooth, low-cost ditching . . . less time adjusting for obstructions or changing conditions. Check these advanced features yourself. Contact your Gar Wood-Buckeye dealer, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.



Gar Wood - Buckeye Hi-Way Widener will help you increase your profits from the big secondary-road improvement program! This one-man, one-pass machine digs a mile of finished subgrade per day . . . can easily pay for itself on a single job. Digging wheel quickly swings to the rear for over-the-road travel.



Gar Wood-St. Paul Dump Bodies and Hoists speed your hauling cycles. Twin lift arms are anchored together . . . exert equal lifting force regardless of load distribution. One-sided lift-strains are eliminated . . . dumping is smooth and safe, even on steep slopes. Hoist is easily serviced with ordinary truck tools.

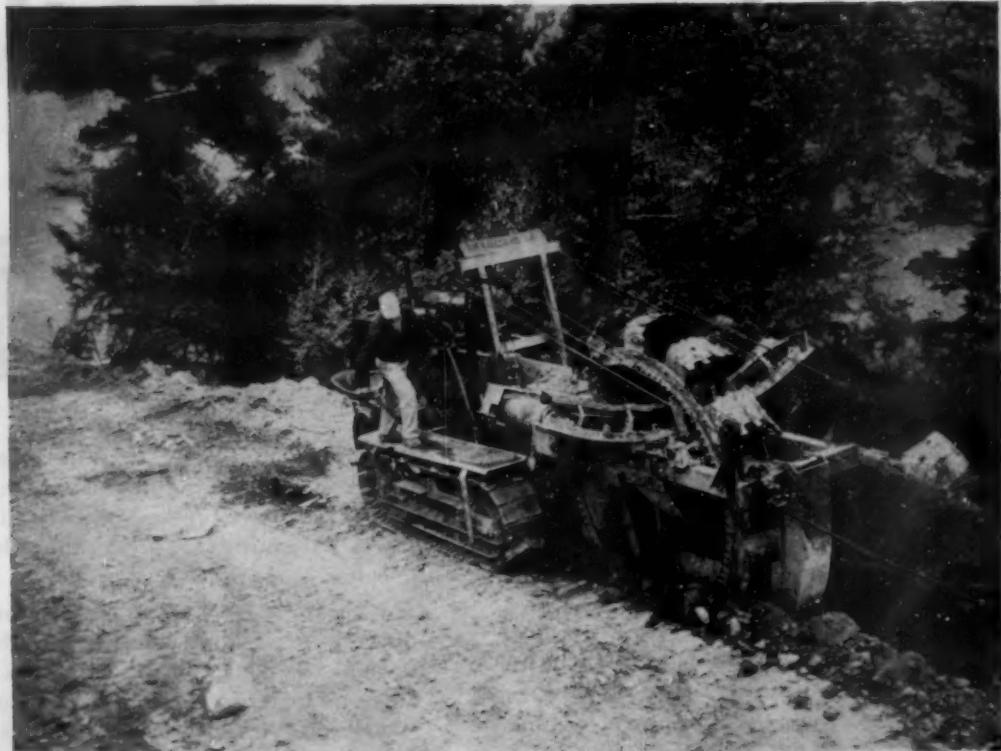
INDUSTRIES, INC.

Wayne, Michigan

YPSILANTI, MICH.; FINDLAY, OHIO; MATTOON, ILL.; RICHMOND, CALIF.

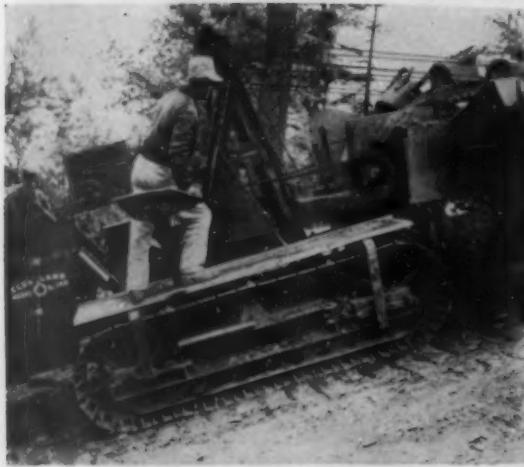
... for more details circle 279, page 16

ROADS AND STREETS, June, 1957



Cleveland 140 digs through rocky New Hampshire hills

"...exceeds wildest expectations"



"We got trench with our Clevelands where we thought it would be impossible," says H. J. Burns of Hallen Construction Co., Island Park, N. Y., about a recently completed pipeline job for the Granite State Transmission Co., between Exeter and Somersworth in the rugged New Hampshire hills. The Hallen spread cut through numerous swamps and terrain strewn with boulders and choked with frequent outcroppings of rock.

"Our Cleveland 140 cut 24 miles of our 30-mile section—dug everything except the deepest swamps and solid ledge rock. It dug through shale and even handled boulders up to 6 and 8 cubic feet. Even in the toughest going the 140 never fell below 1,700 feet of trench per day and averaged 2,200 feet per day for the whole job."

Good



Everywhere

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

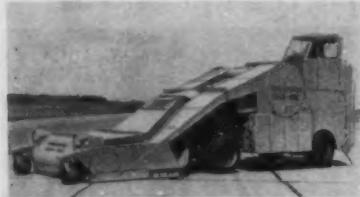
for more details circle 264, page 16

ROADS AND STREETS, June, 1957

What's New in Equipment and Materials

(Continued from page 174)

developed by Coleman Engineering Co., Inc., 6040 Jefferson Blvd., Los Angeles 16, Calif., and is manufactured under license by Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich.

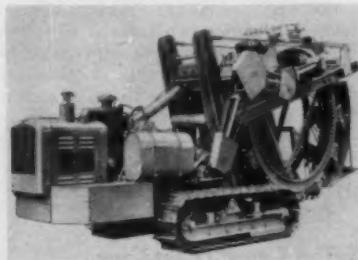


Fruehauf and Coleman "Cole-Vac"

For more information circle 119 on Service Coupon Page 16 and mail now.

Wheel-Type Trenchliner

The Parsons Co. of Newton, Iowa, a division of Koehring Co., has added a large capacity trenchliner, the "Parsons 170," to its line of wheel and ladder-type trenchers. A new feature is a hydraulically-driven conveyor that



Parsons Trenchliner

provides belt speeds up to 600 ft. per minute yet works completely independent of the wheel speeds. As a result, spoil can be placed at a convenient distance from the trench wall when wheel speeds are slowed due to tough digging conditions. The "170" will produce from 12 in. to 25 ft. of trench per minute in a range of 30 digging speeds, according to Parsons' engineers. Maximum digging depth is 5 ft. 9 in. Seven cutting widths are available, from 20 to 32 in., in 2-in. increments.

For more information circle 120 on Service Coupon Page 16 and mail now.

Scraper with Bigger Capacity

Availability of a new large-capacity scraper, designed for use with its D8 and D9 tractors, has been announced by Caterpillar Tractor Co., Peoria, Ill. This unit, the No. 491, replaces the No. 90 scraper in Caterpillar's line. Its



Caterpillar No. 491 Scraper

payload capacity of 82,000 lb. is 12,000 lb. greater than the former model. The new bowl capacities are 27 cu. yd. struck and 34 cu. yd. heaped—an increase of 26 percent. Other features claimed include increased apron opening (15 in. more than its predecessor model) facilitating thorough, positive ejection; higher bowl sides; changes in the shape and height of the dozer-type ejector; tubeless tires, combining stability with good flotation; 3-piece cutting edge with stinger bit center section, designed to facilitate easy digging and penetration; good visibility to the cutting edge from the operator's seat; reported low maintenance costs; high maneuverability.

For more information circle 121 on Service Coupon Page 16 and mail now.

Improved Curb and Gutter Paver

The new model S-57 Dotmar curb and gutter paver just announced by Dotmar Industries, Inc., 502 Hanselman Bldg., Kalamazoo, Mich., incorporates the following changes from the model S-24:

A vibrator mounted on rear hopper provides smooth flow of grout or concrete, resulting in smoother troweling. This also prevents tearing or dragging.

A mechanical tamper with its tamping shoes operating in forward hopper assures a more uniform concrete structure. Machine operator needs only to keep hopper filled—tamper works down and compacts the concrete. No hand tamping or spading.

A new clutch between engine and wheel drive transmission enables machine to be operated forward or in reverse. Power can be backed up for second pass where necessary.

It is stated that the paver lays and finishes up to 10 lineal feet per minute and therefore does not detain the

ready-mix trucks. It can be readily adapted for paving integral gutter, curb and sidewalk, or sidewalks alone up to 72 in. wide, and highway median strip or widening strip.

For more information circle 122 on Service Coupon Page 16 and mail now.

Transport Trailer Improvements

Dorsey Trailers, Inc., of Elba, Ala., have announced an improved, removable gooseneck, low-bed trailer, a complete line of oil field floats that can carry from 45,000 to 80,000 lb., and a versatile tandem tilt-to-load trailer with gooseneck.

The announcement states that one-man loading and unloading of heavy equipment is a simple matter with the new low-bed. A hydraulic system lowers the front end to the ground for loading and unloading and lifts it back into running position. The deck also can be lowered or raised two inches



Dorsey Gooseneck Low-Bed

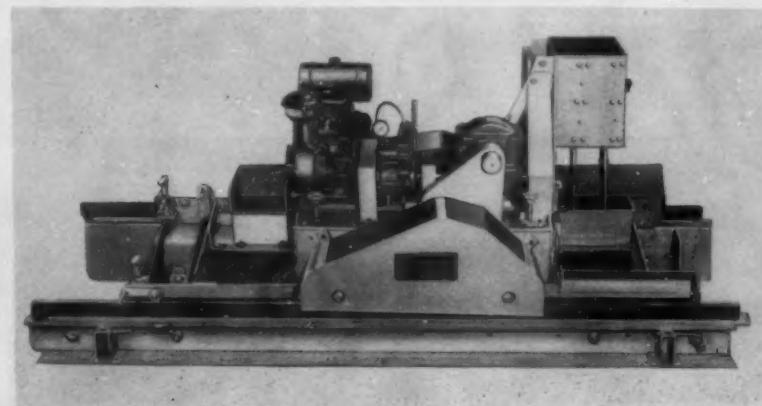
from standard position for extra ground and overhead clearance.

The tandem tilt-to-load trailer has a gooseneck that can be hooked directly to the fifth wheel of the tractor. Precise hydraulic control on this trailer allows the weight of one man to tilt it up or down.

For more information circle 123 on Service Coupon Page 16 and mail now.

Long-Lasting Pavement Stencils

The stencils here shown are made of "Harborite," a Douglas fir plywood with a resin-impregnated overlay that is extraordinarily tough and smooth, it is said. Unlike plywood which "rup-



Dotmar Curb and Gutter Paver

ture" when excess paint is scraped from the face and consequently wear out quickly, some Harborite stencils have been used for six months and are still in good shape, according to the manufacturer. Other reported advantages are its rigidity and strength which make it easy to cut and to handle; its resistance to water and weather which gives it longer life; and its ability to stand up under rough treatment. Harbor Plywood Corp., Aberdeen, Wash., is manufacturer. Samples of the product are available for test by engineers and maintenance men.



Lettering with "Harborite"

For more information circle 124 on Service Coupon Page 16 and mail now.

Heavy Duty Hydraulic Fork Lift

Eimco Corp., 634 Fourth West St., Salt Lake City, Utah, has introduced a new heavy-duty fork lift featuring hydraulically-operated four-way tilting and leveling. The unit is mounted on a crawler tractor with 143 hp and torque converter. It is produced as an attachment for the Eimco model 105 tractor.

For maximum visibility and greater work control, the operator's seat is at the front. Unidrive transmission with independent track reversal for spin turns gives the unit versatility and operating ease even under close working conditions. The fork lift is interchangeable with the Eimco front-end



Eimco Tractor and Fork Lift

loader attachment and was designed to provide a unit flexible enough to meet materials handling jobs on uneven or sloping ground. The tires are movable to fit various widths of bins, pallets or bundles.

For more information circle 125 on Service Coupon Page 16 and mail now.

Easy-Operating Whiteprinter

The C. F. Pease Co., 3948 Rockwell St., Chicago 18, Ill., has just introduced a new automatic whiteprinting machine called the "Crusader." It is designed to reproduce, at speeds up to



Pease Whiteprinter

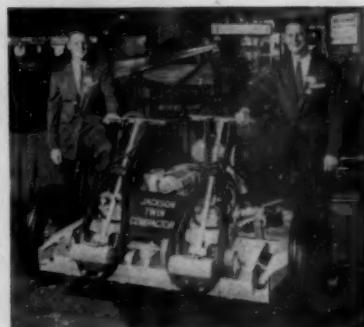
32 ft. per minute, anything typed, written, drawn or photographed on reasonably translucent material. Exposure of

sensitized material is accomplished by use of a heavy duty 4000-watt high pressure mercury lamp.

Dry development of prints by ammonia vapors is instantaneous. In operating, the tracing with sensitized material is fed into the machine, the rest being automatic—printing, copy separation, development, print delivery and stacking. The original tracing or copy is automatically returned to the operator for additional feedings. For continuous yardage operation from rolls, an automatic wind-up device is available at small additional charge.

For more information circle 126 on Service Coupon Page 16 and mail now.

Twin Compactor-Trailer Unit



Jackson Twin Compactor-Trailer

Jackson Vibrators, Inc., Ludington, Mich., announces a new twin compactor-trailer unit, a machine which picks up, lowers, transports and furnishes power for two Jackson vibratory compactors. Both compactors may be operated by one man in the consolidation of granular soils in concrete floor sub-bases and fills, also blacktop densification in street patching, paving walks, drives, etc.

For more information circle 127 on Service Coupon Page 16 and mail now.

8-Ton Capacity for Crane

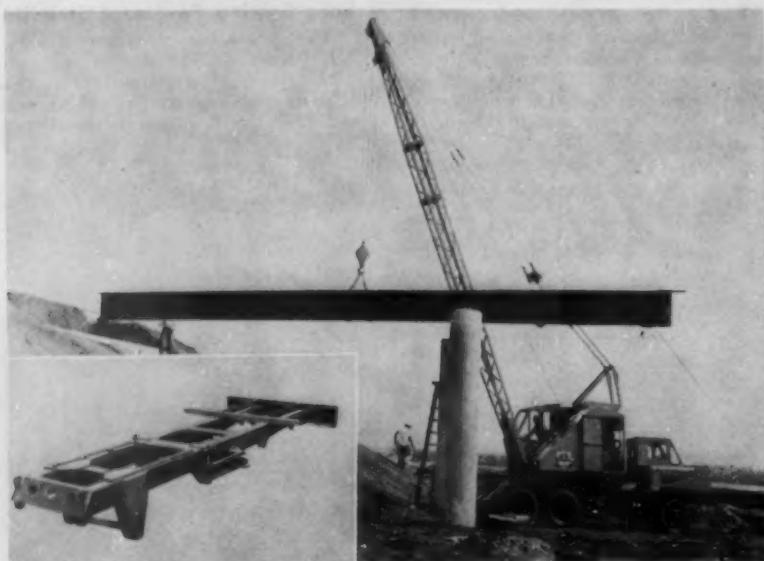
Schield Bantam Company, Waverly, Iowa, has announced an 8-ton lifting capacity for its crane carrier-mounted model T-35. The company says that the increased capacity is the result of extensive testing and modification of the former 7-ton model. It is stated that the new T-35 basic, when mounted on the "Bantam" heavy-duty "gooseneck" crane carrier, will handle a full 8-ton load working at 10-ft. radius, over-end with outriggers. Operating capacity without outriggers is also increased. A major factor in these increases, says the company, is the extra stability offered.

For more information circle 128 on Service Coupon Page 16 and mail now.

Standard to Spot Welding Work

Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y., has announced the availability of an "Aircomatic" spot kit that converts standard model 21

(Continued on page 184)



Schield Bantam Model T-35



**High-production excavating and trenching
with the HYSTER**

D4 HYDRAULIC BACKHOE *combination backhoe and bulldozer*

Using dozer blade, this
machine clears way to job
site, performs many rough-
grading, leveling and back-
filling chores without add-
ed equipment.

COMPARE THESE PERFORMANCE BENEFITS *then see a working demonstration*

Designed specifically for Caterpillar-built D4 Tractors.

Develops approximately 4 tons digging force at the teeth and balanced by tractor weight to use it all.

Simultaneous swing and hoist at full hydraulic pressures from separate pumps.

Large hydraulic capacity for continuous, all-day operation without overheating.

Track-type tractor mobility retained by exclusive patented equalizer arrangement.

Hyster's hoe, mounted on a Caterpillar D4 Tractor, will go anywhere to get at the tough jobs. It gives you all the advantages of a combination excavator-bulldozer with full track-type tractor mobility. Handles all kinds of utility trenching and digging jobs at low cost. Everything about this rugged machine is engineered for performance far beyond the capacity of other hydraulic backhoes.

**Call your Caterpillar-Hyster® Dealer
for demonstration.**

HYSTER COMPANY



Caterpillar is a registered
Trademark of Caterpillar
Tractor Co.

... for more details circle 291, page 16
ROADS AND STREETS, June, 1957

2995 N. E. CLACKAMAS ST. PORTLAND 8, OREGON
1895 N. ADAMS STREET PEORIA 1, ILLINOIS
PORTLAND, OREGON; PEORIA, ILLINOIS; NIJMEGEN, THE NETHERLANDS



D9's and D8's show peak production on Olin Mathieson's \$95-million Ohio plant!

When Allegheny Contracting Industries, Inc., Pittsburgh, Pa., took on an 8,500,000 cubic yard earthmoving contract for Olin Mathieson's new \$95-million aluminum plant near Hannibal, Ohio, this construction firm brought in its big team of torque converter-equipped Caterpillar D9 and D8 Tractors to handle the giant sized "landscaping" job.

Using the powerful D9's (currently 320 flywheel hp) and D8's as pushers, one hour and weight study taken of five Cat DW21 Tractors showed an average hourly production to be 150 bank cubic yards per hour per machine on a 1500-ft. one-way haul.

"We give the torque converter a lot of credit for our high-production per-

formance," says Allegheny's Vice-President W. J. Parish. "We're handling loose sand and gravel... and the going can get mighty rough at times. The weather has been against us on this job — yet our torque converter-equipped machines do not 'dig in' on a hard pull."

The torque converter drive of the Cat-Built Tractors, which standardizes on Twin Disc Torque Converter components, matches the machine's output torque to the load, regardless of operating conditions . . . cushions out shocks and vibrations to reduce parts wear and breakage . . . minimizes or eliminates gear-shifting . . . provides accurate load control . . . and improves over-all flotation.

Specify a torque converter in your next Caterpillar D9 or D8 Tractor. Enjoy the benefits of greater productivity — bigger profits.

Twin Disc Clutch Company, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois.

This torque converter-equipped Cat D9 Tractor is push-loading DW21 Tractors and Scrapers at peak-level performance on Olin Mathieson's giant aluminum plant site. Twin Disc components are standard for the D9's torque converter drive.



TWIN DISC

Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa



KANSAS TURNPIKE: MARVEL OF FAST ROAD BUILDING

236 miles of super highway put through in 2 construction seasons—that's the engineering construction marvel of the \$140 million Kansas Turnpike which opened to traffic in October of 1956.

Super compaction equipment played a big part in this record building, too; the Freeto Construction Co., Pittsburg, Kans., and the T. L. James Co., Ruston, La., were but two of the turnpike contractors who relied on BROS 50-ton Roll-O-Pactors to obtain 100% AASHO densities on the top 18" of subgrade and 95% on the lower 18". Compaction was handled in 6" lifts.

Specifications called for three passes with the 50-ton rollers after specified densities had been reached. Because of soil variations, the CBR (California Bearing Ratio) varied between 50-75% on the subgrade.

FOR WIDE VARIETY OF ROCK, SOIL AND MOISTURE CONDITIONS

Roll-O-Pactor compaction results fulfill the strict design criteria written for the whole range of acceptable turnpike subgrade materials. Why? Because BROS compaction engineers grew up with heavy earthwork consolidation . . . developed and pioneered the vital 19° wheel oscillation and pitch control features of heavy rubber tire rollers . . . cooperated with federal and state engineers in proving the unmatched value of this equipment for consolidation and densification of subgrade materials.

Write for complete Roll-O-Pactor information or see your nearest BROS Distributor.

ROAD MACHINERY DIVISION

BROS Incorporated

(formerly Wm. Bros Boiler & Mfg. Co.)

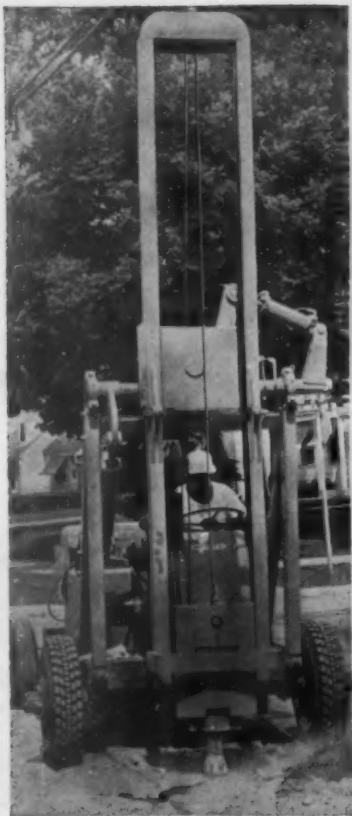
1057 TENTH AVE. S. E. • MINNEAPOLIS 14, MINN.

... for more details circle 363, page 16

ROADS AND STREETS, June, 1957



Top Photo: Freeto Construction Company's BROS Model 450 roller compacting subgrade on the Turnpike. *Center:* T. L. James Co. Model 450 compacting subgrade on Section 11 of the Turnpike. *Bottom photo:* Compaction on the same section with the BROSPP-54 Self-Propelled rubber tire roller.



**BOOST YOUR PROFITS
ON LOW BIDS
with
ARROW
MOBILE HYDRAULIC
HAMMERS**

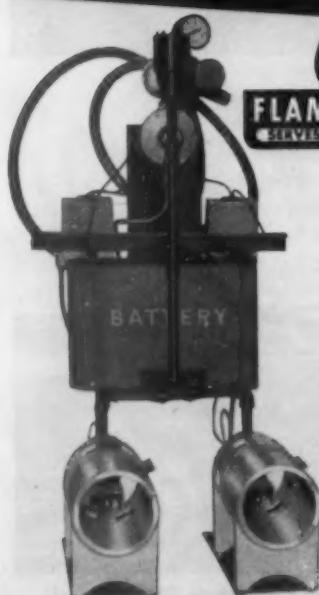
Increasing the efficiency of an operation is the best way to cut costs. ARROW MOBILE HYDRAULIC HAMMERS have cut costs for contractors, public utility companies, cities, counties, and others. They can help you **MAKE MORE MONEY—SAVE MORE MONEY—IN LESS TIME** on such jobs as concrete breaking, asphalt cutting, backfill tamping, driving posts and piling. Once tried, ARROW MOBILE HYDRAULIC HAMMERS are preferred above all other machines designed to do this work. **GET THE FACTS—THEN YOU'LL GET AN ARROW.**

Ask Your Dealer for a Demonstration
or contact
ARROW MANUFACTURING CO.

Box 4120 South Denver Station
Denver 9, Colorado

... for more details circle 242, page 16

**FLAMEGAS INTRODUCES NEW
ASPHALT & TAR KETTLE BURNER**



FLAMEGAS
SERVES AMERICA

SPEEDS UP WORK

SAVES YOU MONEY

OPERATES ON PROPANE (LP) GAS

BURNERS GUARANTEED

- Speeds up heating of tar, asphalt and pitch.
- Compact, portable unit available with single or multiple burners.
- Burner operates on 6 or 12 volts, an electrical system or stand-by battery.
- Easily mounted and transported. No downtime, always operates.
- 2000° temperature—no soot, no carbon, no flies to clean.
- No messy oil drums, to collect refuse or water, or topple over.

Flamegas ASPHALT and TAR KETTLE BURNER speeds up heating. After burner is lit, set controls operate with complete safety. You're set to go when your work crew arrives.

FLAMEGAS DETROIT CORP.

12901 Auburn Avenue

Detroit 23, Michigan

... for more details circle 276, page 16

**What's New
in Equipment
and Materials**

(Continued from page 180)

manual "Aircomatic" welding guns for arc spot welding. The kit consists of an auxiliary control panel, an outer barrel and a flat nozzle. Spot welding of lap joints, or tack welds in a butt, lap or fillet joint can be made on mild and stainless steels.

Welds are produced by placing the gun against the work and operating



Air Reduction Co. Spot Welder

the trigger. The heat of the gas-shielded arc between the work and the automatically fed filler wire produces a circular weld. The required amount of filler wire is melted off, being added to the weld for reinforcement. All necessary operations—wire feed, weld time, pre-weld gas purge, and post-weld gas and water flow—are automatically controlled. Standard model 21 "Aircomatic" guns are rated at 350 amperes, continuous duty.

For more information circle 129 on Service Coupon Page 16 and mail now.

Aluminum Foot Valve Strainer

A new heavy duty aluminum foot valve with strainer, said to be light enough to be handled easily by one man, has been developed for use in irrigation, construction, mine drainage, general industrial and inland marine pumping applications and for pumping "drilling mud" in oil well drilling operations. Designed by Clayton Mark & Co., 1900 Dempster St., Evanston, Ill., this foot valve weighs 41 lb. for the 8-in. pipe size and 19 lb. for the 6-in. size.

Rugged construction and resistance to corrosion and mechanical damage are featured. The top and basket of the valve are constructed of heavy-



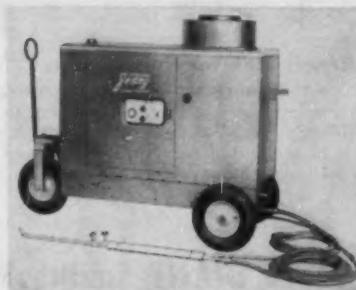
walled aluminum alloy castings and the body is threaded and machined for easy assembly to the pipe. Also made of aluminum is the valve seat ring which is replaceable. The valve flap is of canvas-reinforced rubber that fits snugly to the seating service.

Clayton Mark
Foot Valve

For more information circle 130 on
Service Coupon Page 16 and mail now.

180-gal. Capacity Steam Equipment Cleaner

Fingertip control of flushing and rinsing capacities up to 480 gal. per hour is a reported feature of model 1858 "Hypersure Jenny," one of 11 new steam cleaner models announced by Homestead Valve Manufacturing Co., Coraopolis, Pa. Known as series 1800, this line of steam cleaners has 180 gal. per hour steam cleaning capacity for removing dirt and



Homestead "Hypersure Jenny" grease from industrial machinery, material handling and construction equipment, trucks, tractors, parts, etc. These Jennys, either single gun or two gun operation, offer a choice of oil-fired or gas-fired units in stationary, portable, or trailer mounted types. In places where electric current is not available, units are offered with gasoline engine drive in place of electric motor.

For more information circle 131 on
Service Coupon Page 16 and mail now.

Pivot Shaft-Removing Tool for Euclid Tractor

A simple means of "splitting" the Euclid TC-12 twin-engine tractor by pushing the pivot shaft out of its housing with hydraulic power has been developed by the Owatonna Tool Co., 435 Cedar St., Owatonna, Minn. The new tool, called the "OTC Y-712A Pivot Shaft-Removing Tool," utilizes an OTC 50-ton "Power-Twin Ram" and forcing screw for power. In service, the cover plate, retainer caps and other retaining parts are removed and the tool is mounted in existing cover bolt holes.



OTC Shaft-Removing Tool for
Euclid Twin-Engine Tractor

For more information circle 132 on
Service Coupon Page 16 and mail now.

BMCO SELF PROPELLED PNEUMATIC TIRED ROLLER LEADS the FIELD



ON ASPHALT
OR
ON BASE



YES! BMCO IS WAY
OUT FRONT

- 4 speed Forward — 4 Reverse
- Torque Converter
- Automotive type "power" steering
- All wheels oscillate — insures better tire wear and more even compaction.
- Hydraulic reversing unit

See Your BMCO Dealer For
A Demonstration Today!

BROWNING MANUFACTURING CO.
111 HUMBLE AVE. SAN ANTONIO, TEXAS

... for more details circle 251, page 16

Street Broom for Tractor

A new street broom for tractor rear mounting has been introduced by Shawnee Manufacturing Co., 1947 N. Topeka Ave., Topeka, Kans. Three-point linkage providing easy attachment and removal is featured. Quick couplers on the hydraulic lines further speed mounting and demounting, according to the company.

Broom is 7 ft. wide, rotated by hydraulic power, and may be angled 15 deg. to right or left. A swivel-mounted stabilizing wheel at the rear aids in smooth operation. The broom itself may be tilted by manual adjustment. The unit is designed for use on all types of roadway surfaces and is especially adaptable for airport runways because of the high visibility afforded the operator.



Shawnee Street Broom

For more information circle 133 on Service Coupon Page 16 and mail now.

"X" Style Carbide Rock Bit



Vascoloy-Ramet "X" Bit

Vascoloy-Ramet of Waukegan, Ill., announces a new series of rock bits with tungsten carbide inserts made to fit directly on type 600 and 1000 series steels. Designed with the inserts mounted in an "X" formation, these new bits are said to eliminate rifling and provide uniformly round holes in hard ground. They feature 5-hole construction and wide chip channel design for faster removal of larger chips.

Style 600 "X" bits are available in 3, 3 1/4, 3 1/2, 3 3/4, 4 and 4 1/2-in. diameters. Style 1000 "X" bits are available in 4, 4 1/2 and 5-in. diameters.

For more information circle 134 on Service Coupon Page 16 and mail now.

Multiple Relays for Lighting

A series of multiple relays for control of street and highway lighting is in production at Micro Balancing, Inc., Garden City Park, N. Y. Models are designated as "Lumatrol" WM, WMF, WMFB and PM, the model letters indicating the type of mounting to which units are adapted. All feature lifetime mercury-to-mercury contractors, stainless steel non-breakable contractor housing and reliable operation within a broad range of line voltages.



"Lumatrol" Multiple Relay

For more information circle 135 on Service Coupon Page 16 and mail now.

Repair Link for Hoist Chains

A new "missing link" for repairing hoist and drag chains has been developed by Kensington Steel division of Poor and Co., 505 Kensington Ave., Chicago 28, Ill. It consists of two identical links.

(Continued on page 189)

More GIANT Sizes! More GIANT Tread Designs! More GIANT Savings! Now at SOUTHERN TIRE COMPANY!



Probably more dirt and rock is hauled on Southern Tire retreads than on any other retreaded tires. That's because more and more contractors and heavy equipment operators are discovering the superior quality and economy of Southern Tire retreads.

Southern Tire offers not only the country's most complete range of tire sizes and tread designs, but also the world's finest retreading facilities—three-sectional molds that mean no buffing to breaker strips regardless of growth.

These facilities and use of finest tread rubber, plus Southern Tire's long experience, assure better quality with greater economy. Call your tire dealer now for facts about how Southern Tire retreads can save you as much as 40% of the price of new tires yet give you guaranteed new tire service.

• All sizes—from 1100 x 24 to 33.5 x 33



**SOUTHERN
TIRE COMPANY**

1414 Broadway
SHEFFIELD, ALA.

Phone Collect
EV 3-2312

... for more details circle 325, page 16
ROADS AND STREETS, June, 1957

TROJAN....

STANDS OUT ON THE TOUGH JOBS!



... TROJAN owners never hesitate to tackle the tough jobs! On difficult landclearing, digging in rocky, dry soils or working with extra heavy materials they know that the power, stamina and balanced design of their machines will always permit an honest day's work . . . So many "extras" are standard with TROJAN and so many useful operating features are built into every machine that we'll gladly demonstrate against any comparable model — any place and any time . . . Make a date with your TROJAN distributor!



EVER WORK IN MOIST SAND? . . . Look how this TROJAN heaps the bucket yet remains perfectly stable without any tendency to tip at any point in the lifting cycle . . . Big tires give full traction and flotation to work at high speeds.

Check This List of Important TROJAN Features

Reverse Curve Safety Arms
Straight Line Horizontal Thrust
Independent Bucket Action
Low Load Carrying Position
Allison Torqmatic Transmission

Detroit Timken Full-Floating Axles
GM Diesel Engine Available
Self-Centering Finger Tip Controls
Box Welded Frames
No Stopping to Shift

Foot Clutch Eliminated
Shift Easily at Full Throttle
Fastest Time Cycle
Standard 90" Bucket Spans Wheels
Bucket Position Indicator



TROJAN TRACTOR SHOVELS

YALE & TOWNE

2 & 4 Wheel Drive Front-End Loaders

AD NO. 44-83

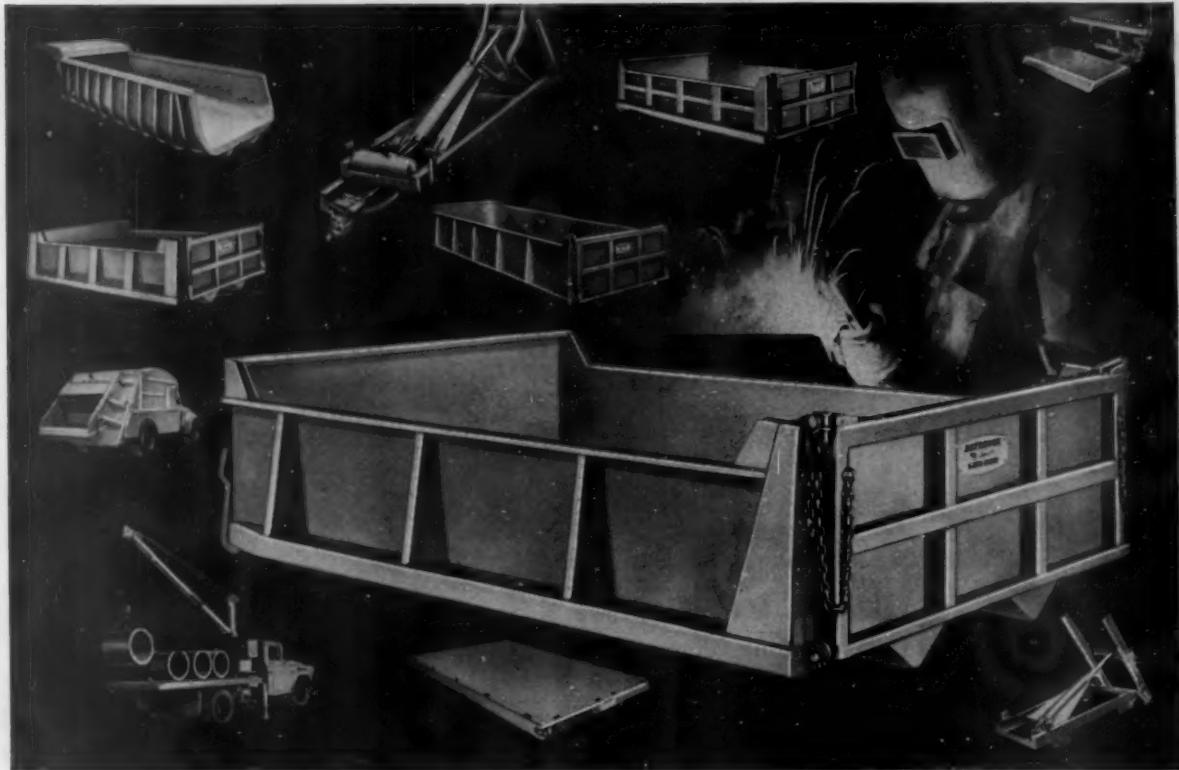
CONTRACTORS MACHINERY DIV., THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK; SAN LEANDRO, CALIFORNIA

... for more details circle 350, page 16

ROADS AND STREETS, June, 1957

LOOK TO DAYBROOK

...for a New Standard of Workmanship in
Truck Equipment for Street or Highway Work!



Daybrook Dump Bodies and Hoists, long a favorite for street and highway work, are now sharing top recognition with other outstanding units of the complete Daybrook line of materials handling equipment for trucks—Power Gates, the Power Loader (truck crane) and Power Packers (refuse bodies).

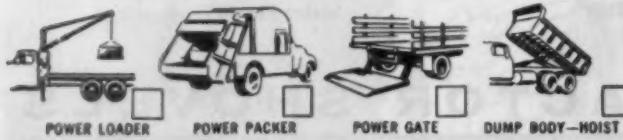
Today, Daybrook serves municipalities and local and state governments, the world over, in many ways. The dumping of loads for new construction or repair work and the handling of materials on and off trucks

speeds up all operations and favors lower costs with speed and greater safety.

If the loading and unloading of trucks for any material, load, or capacity is building up budget problems, then Daybrook can solve them with dependable equipment best suited to the purpose.

You'll like the new Daybrook standard of built-in quality... and the economy of longer service life, too!

SEND DAYBROOK LITERATURE CHECKED BELOW:



Sign below, attach coupon to letterhead and mail in envelope.

Name _____

188

DAYBROOK
Speedlift®
TRUCK EQUIPMENT

DAYBROOK HYDRAULIC DIVISION
L. A. YOUNG SPRING & WIRE CORPORATION
BOWLING GREEN, OHIO



ROADS AND STREETS, June, 1957

What's New in Equipment and Materials

(Continued from page 186)

tical half links and a combination key and wedge. The half links are inserted through the ends of the chain to be joined; then when the wedge is driven into place, it automatically bends the key and thus locks the link together. No welding, burning, or riveting is needed.

The material is "Supermang," a high manganese alloyed steel specially developed for extra strength and ability to resist wear.

Available in sizes from 1 to 3 in., Kensington repair links are said to fit all standard cast manganese drag and hoist chains.



Kensington "Missing Link"

For more information circle 136 on Service Coupon Page 16 and mail now.

Tungsten Insert Rock Bits

Atlas Copco Eastern, Inc., of Paterson, N. J., has announced a new line of long-life Sandvik Coromant detach-



Sandvik Coromant Bit

able bits incorporating tungsten carbide inserts. The 16 bits—designed for all rock drilling needs—range from 1½ to 4½ in. in diameter. They are made to fit standard shoulder type drill rods with F.H.D. and K threads.

For more information circle 137 on Service Coupon Page 16 and mail now.

20-oz. 6-in. Air Hammer

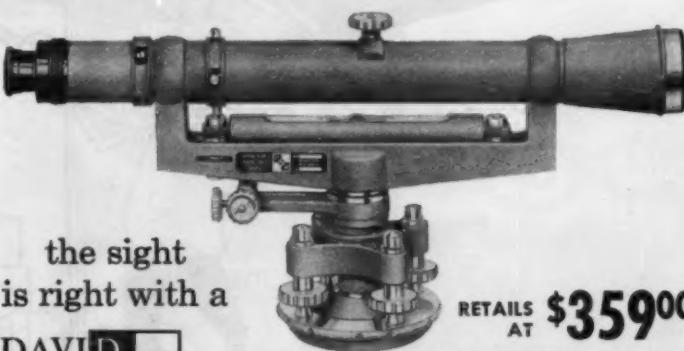
A new light weight air hammer has just been announced by Superior Pneumatic and Mfg., Inc., 4758 Warner Rd., Cleveland 25, Ohio. The new "Bantam Bully" measures 6 in., weighs 20 oz., and uses 6.5 cfm at 90 psi. A metering trigger lets the operator con-



Superior Air Hammer

trol blows per minute all the way from 0 to 13,000 with just a light pressure of the finger.

For more information circle 138 on Service Coupon Page 16 and mail now.



the sight
is right with a

DAVID
WHITE

RETAILS
AT \$359.00

Write for NEW Instrument Catalog

7180 ENGINEERS' 18-INCH DUMPY LEVEL—especially developed for profile leveling, taking cross sections, setting slopes and grade stakes, sewers and pipe lines, railroads, topographic surveys and contouring. Engineered with unfailing accuracy . . . designed with fewer parts to eliminate wear and displacement. Before you buy, compare this White Dumpy level with a similar model of any other recognized make. From every standpoint—design detail . . . quality construction . . . work-speeding, life-lengthening features and cost—you'll quickly see why a White's the best buy you can make.

UP TO THE MINUTE IN DESIGN • DOWN TO THE SECOND IN ACCURACY!



7015 Engineers' Transit—ideally suited to the needs of engineers, contractors, surveyors—highways, bridges, roads, mines, forests, subdivisions, sewers, dams, farms, large construction, etc. Retails at \$465.00



8300 Universal Builders' Level Transit—for heavy-duty work in connection with all survey and check-up operations on buildings and road construction, etc. Retails at \$187.00



8200 Construction Transit—ideally suited for work in connection with highways, bridges, roads, mines, forests, sewers, dams, farms, etc. Retails at \$345.00

Prices slightly higher west of the Rocky Mountains

DAVID WHITE INSTRUMENT COMPANY

2051 North Nineteenth Street, Milwaukee 5, Wisconsin

... for more details circle 344, page 16



Why use automobile grease in heavy-duty equipment?

Let's not kid ourselves about the difference between the lubrication requirements of automobiles and heavy-duty machinery. D-A Lubricants are compounded specifically for heavy-duty equipment. There is a right one for every application.

For example, D-A Track Roller Lubricant • D-A Type AC Track Roller Lubricant • D-A Winter Track Roller Lubricant • D-A Open Gear • D-A Torque Fluid • D-A Lithium, Extra-Heavy.

Let your D-A Representative give you all the facts on how D-A Lubricants can reduce parts wear and minimize downtime . . . *increase the return on your equipment investment.*

D-A Lubricants make equipment last longer



Bituminous ROADS AND STREETS



Mechanical equipment has been developed for speeding the forming and compacting of asphalt mixes into various curb shapes.

Published by Gillette Publishing Company,
22 West Maple Street, Chicago 10, Illinois

Give Hot-Mix Contractors Better Specifications
Fabric-Reinforced Asphalt Mix Protects Causeway

JUNE, 1957

For men who
like to
underbid their
competitors...

(and make a nice profit, too)



Pioneer VIBROmatic Paver excels all others in uniform density and quality of mat

The Pioneer Bituminous Team

The PIONEER VIBROmatic Paver operates on an entirely new principle. Simple in design, and easiest-of-all-pavers to operate, yet it lays a mat of exceptional quality... and lays it faster than any other paver yet built!

Secret of this unusual performance is its revolutionary VIBRO-matic oscillating screed action which, together with the high-speed, heated vibrating compactor, lays a smooth mat with fewer voids and more uniform density than any other paver.

Performance is just as outstanding at high speeds as low. The PIONEER VIBROmatic has laid smooth, even mats $1\frac{1}{2}$ " thick, 12' wide at a 73' per minute rate.

PIONEER HOT-MIX PLANTS are champions in Mobility and Performance.

First. Mobility. Only two main units; each complete on its own rubber-tired chassis. Those hours you'll save per move count up fast in dollars and cents.

Second. Performance. Measure it by output and you'll find PIONEER Continuflow plants delivering up to 200 tons per hour. Measure it by quality of product? You'll discover these modern plants give exact proportioning and uniformity that meets toughest specifications. Or economy? Savings of fuel and power, efficient recovery of fines, and low upkeep help you attain a low cost per ton.

Sold and Serviced by

E. F. CRAVEN COMPANY
Greensboro & Greenville, North Carolina

BEMISS EQUIPMENT CORPORATION
Richmond, Salem and Falls Church, Virginia

RICHARDSON TRACTOR COMPANY
Charleston & Clarksburg, W. Va.

DRAVO-DOYLE COMPANY
Pittsburgh, Pennsylvania

JOHN C. LOUIS COMPANY, INC.
Baltimore and Washington, D. C.

Distributors of

Pioneer®
EQUIPMENT



Pioneer Portable Continuflow Central Mix Bituminous Plants are available in 3 sizes with capacities up to 200 tons per hour.

... for more details circle 317, page 16

ROADS AND STREETS, June, 1957

FANTASY YESTERDAY... ROUTINE TODAY...

when asphalt's there to help!

The construction of roads and freeways that only yesterday were considered fantastic is now going full speed ahead. Thanks to asphalt this construction is easier, better and less costly. Comparative cost figures make it plain that in initial cost and in maintenance, asphalt saves millions on heavy-duty roads. And if you have driven on asphalt—and on anything else—that's all the argument you need in favor of asphalt for safer, more comfortable riding.

Sohio long ago established itself as one of the largest producers and sellers of asphalt in the nation. To maintain this reputation, two factors have been responsible—consistent top quality and Sohio's famous "round-the-clock" service that loads and delivers asphalt supply where and when it is needed *day or night*. To take advantage of this service, make Sohio *your* source of asphalt supply. Call or wire, Sohio, Asphalt Division, Midland Building, Cleveland 15, Ohio.



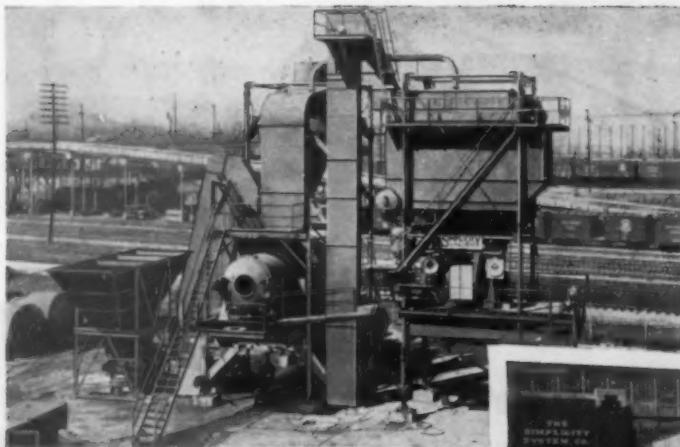
ASPHALT SERVICE



Member, The Asphalt Institute

... for more details circle 327, page 16

ROADS AND STREETS, June, 1957



March 13—erected
and tested on Simplicity
Yard, Chattanooga, Tenn.

March 16—last of 6
cars required rolls out of
Simplicity Plant at Noon.



Sure, you can have both!
PORTABILITY
and
DEPENDABILITY!

Simplicity's S-200 Plant with Automatic Batch Control is as portable as any of comparable capacity on the market . . . without sacrificing dependability, durability or economy! Let us put you in touch with Simplicity Plant owners . . . they can give you facts from first-hand experience!

The Simplicity S-200 includes: 4 compartment, 50 ton feeder bin; 10' x 20' dryer; complete dust collection system; 50' high hot elevator; 2½ deck 5' x 14' screen; 85 ton bin; fully automatic weighing and batching equipment which may be operated manually; conservatively rated 8,000 pound steam or oil heated fast dumping mixer.

Total Weight 302,699 pounds
(June 1957 price, less than
43c per pound).

10 days later and 500 miles away . . .
at Forest City, Arkansas:

March 23—erected;
4th Simplicity Plant
bought by Ben M. Hogan
& Company, Little Rock, Ark.



DEPENDABLE

THE **SIMPILITY**
SYSTEM

FROM BUILDER TO BUYER
BETWEEN MEN WHO KNOW

THE **SIMPILITY SYSTEM CO.**

RIVERSIDE DRIVE • PHONE MADISON 2-2144

CHATTANOOGA 6, TENNESSEE

. . . for more details, circle 349, page 16

ROADS AND STREETS, June, 1957

VIEWS AND COMMENTS

By H. G. Nevitt

Communications

THE LARGE corporations are finding out that an important factor in the success of their operations is communications—that is, dissemination among their considerable personnel of their policies, basic facts concerning their operations and other information which is essential to decisions in their best interest by the various people to whom responsibility must be delegated.

An almost parallel situation exists among road builders today. As we have had frequent occasion to remark, the principles by which better and cheaper roads can be built have advanced more rapidly than their application in the majority of construction. One of our aims has always been an attempt to do our stint in overcoming this handicap—a very desirable objective in view of the complexities of highway technology and the considerable expenditures involved, not to mention the possible benefits to the nation.

Two types of communications are desirable for this purpose. They might be described as internal and external. Both are important: the former for better organization and operation; the latter to keep these activities up to date and prevent them from becoming somewhat introverted—a rather serious tendency among some highway departments.

• *To the outsider* it would sometimes appear that internal communications have been given the least thought and planning. Mr. Greer of Texas likes to jokingly remark that he is attempting to correlate the activities of some 26 separate highway departments-headquarters and 25 district offices. Actually this state, confronted with perhaps a greater-than-average aggravation of the problem, has taken some very commendable steps to improve this matter of internal communications; others would do well to give the matter like thought.

In principle, the means for external communication have existed

for a long time: where a deficiency exists it lies in the failure to take advantage of them. There is first of all the most easily utilized form of communications, the written word. While highway technology has progressed with extreme rapidity, there are nevertheless good books on the subject, and the technical press devoted to this field is quite active. Anyone who will study can keep fairly well up to date from these sources, supplemented by the proceedings of the various meetings held by engineering societies, colleges, and similar.

To augment these ample references are activities in which the communication is through direct contact. Here again, any deficiency is mainly in the failure of those needing to do so to attend, rather than a lack of places to go and learn. However such failure is rarely attributable to the individual; this situation will receive more comment later on.

• *The preceding* exemplifies the several means by which communications may be maintained. Best of all is personal contact—the direct exchange of ideas with others, especially if they are specialists in the particular subject under discussion. The material producers attempt to do an excellent job in this respect, and the increasing use of consultants has become quite helpful as specialization in the highway field (as well as in all others) becomes increasingly necessary. However, the limitations on such direct contacts are severe; only a few men are likely to get enough of them.

Another form of direct contact, almost as effective and more efficient from the standpoint of the number of men benefited, is through meetings. The professional societies will keep anyone posted in their particular fields of activity who will attend their meetings and listen to the papers and discussions. However, for obvious reasons even these can serve a relatively small percentage of those who need this type of contact.

It is only too evident that a considerable number of secondary meetings, serving a limited geographical area, are likewise needed. With a suitable program and a sufficient attendance of experts, these local meetings will give the majority of those attending about as much benefit as the larger national meetings. There has been much good work done in this matter of secondary meetings, particularly by the asphalt industry and the colleges. But the demand is still greater than the supply; many highway organizations would be well advised to give consideration to amplifications of such contacts, perhaps to some extent within their own organizations.

• *Finally, we have* reading as a third form of communication. While it lacks the painless assimilation possible from personal contact, it has the compensation of permitting careful study, review and reflection to assure more thorough understanding of the subject matter under discussion. We believe it can be safely said today that anyone concerned with highway construction in any phase can keep abreast of the times, if he will conscientiously devote sufficient time and energy to reading the publications available. Periodicals such as Roads & Streets will keep him in touch with new developments. The proceedings of the various associations, societies, or conferences will provide a reference background for the highly technical phase of any point which the current trends show is becoming important. Such communications are of course up to the individual—although administration should recognize that the engineer who is going to keep abreast of developments in his field must need not only time but likewise energy for all the reading this requires.

• *Those directing* our highway activities can make two contributions to good communications. The first is to help see that there are meetings designed to benefit those doing the work at practically every level; the second, to make sure that attendance at them is feasible for the individuals concerned. The meetings can be either internal or external—some of both are essential. Through a sufficient number, reasonably balanced, practically all personnel can be kept up to date, provided the in-

(Continued on page 197)

Number of Paving Grades

Cut by Asphalt Institute

In another move to streamline road paving methods, The Asphalt Institute has adopted a reduction in the number of grades of paving asphalts from nine to five.

In making the announcement here, President J. E. Buchanan said the Institute's action followed a series of exploratory discussions with asphalt users, highway officials and refinery representatives.

Four basic paving grades now officially recognized by the Institute are listed as 60-70, 85-100, 120-150 and 200-300 penetration. A fifth grade of 40-50 penetration asphalt is recommended for special and industrial uses. The accompanying table shows the characteristics and specification limits of the five grades.

"The advantages of the reduction in grades are evident," said Buchanan. "It will simplify the storage and handling problem at the refinery and will certainly make these standard grades more readily available from all asphalt refiners. In turn, the user can reasonably expect better service in delivery and superior distribution of the paving product."

The need for general streamlining of materials specifications has

long been recognized by highway officials. The tremendous pressures exerted by the multi-billion dollar Federal road program has made this a matter of immediate concern. This was recognized this week by A. C. Clark, Assistant Commissioner of Public Roads who indicated to the Institute he would ask for a determined effort by all materials suppliers to strive for simplification of specifications, without sacrificing quality.

Eliminated from the table of grades by the Institute were those in the intermediate ranges: 50-60, 70-80, 100-120 and 150-200 penetration. The penetration value defines the consistency of the asphaltic cement, ranging upward from extremely hard to very soft. The Institute is satisfied that the skip-grading will not affect the quality of the resulting mix.

The reduction in the number of grades of paving asphalts followed similar action three years ago by the Institute in initiating a reduction in grades of emulsified asphalts from six to four.

A project committee of the Institute is currently working toward a reduction in grades of the rapid-curing, medium-curing and slow-curing groups of liquid asphalts.

Specifications for Asphalt Cements, The Asphalt Institute

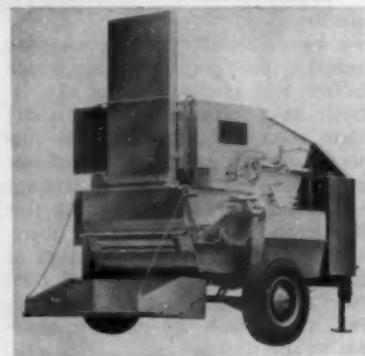
Characteristics	A.S.T.M. Method	Industrial and Special		For Paving Use			
Penetration, 77°F., 100 g., 5 sec.	D 5	40-50	60-70	85-100	120-150	200-300	
Flash Point (Cleveland Open Cup), °F.	D 92	450+	450+	450+	425+	350+	
Loss on Heating, 325°F., 5 hrs., %	D 6	1—	1—	1—	2—	2—	
Penetration After Loss on Heating 77°F., 100 g., 5 sec., % of Original	D 5	70+	70+	70+	70+	60+	
Ductility							
At 77°F., cms.	D 113	100+	100+	100+	60+		
At 60°F., cms.	D 113				60+		
Solubility in Carbon Tetrachloride, %	D 4*	99.5+	99.5+	99.5+	99.5+	99.5+	
Temperature of Use For Spraying, °F.		275-350	275-350	275-350	275-350	275-350	
For Mixing, °F.		275-325	275-325	275-325	275-325	200-275	

*Except that carbon tetrachloride is used instead of carbon disulphide as solvent, Method No. 1

What's New in Equipment and Materials

Asphalt-Patching Mixer

The HTD Mixer No. 10, currently announced by McConaughay Mixers, Inc., Lafayette, Ind., is designed for use with asphalt cements, cut-backs, emulsions or tars. The unit features twin pug-mill mixer, positive proportioning with power-driven pump and counter, low pressure shielded from wind and elements, dust-free operation and replaceable liners. It weighs 5,000 lb. and carries an asphalt tank of 200-gal. capacity; the aggregate bin is of 10-cu. ft. capacity, marked for volumetric measuring.



McConaughay Mixer

For more information circle 139 on Service Coupon Page 16 and mail now.

Filter for Severe Conditions

A new heavy duty air filter which permits uninterrupted operation of construction equipment in dust laden atmospheres and at the same time extends the life of such equipment is announced by Purolator Products, Inc., Rahway, N. J. Two of these units are here shown on an Ingersoll-Rand "Drillmaster." The filter at left protects the compressor and the one on the right is installed on the General Motors Diesel engine. Each filter unit is made up of two micronic, dry-type elements constructed of resin-impregnated cellulose.

It is stated that uninterrupted operation in heavily dust-laden atmospheres resulted in no noticeable wear of working parts in compressors and engines during extensive field tests and that the filters proved 99 percent efficient. These filters are available in 100, 200, 400, 600 and 900 cfm. capacities.

For more information circle 140 on Service Coupon Page 16 and mail now.

(Continued on page 198)



- Speaker's table at the recent Atlanta meeting of the Association of Asphalt Paving Technologists (front row): Ward Parr, association secretary-treasurer, and Mrs. Parr; W. J. Goetz of Purdue University, association vice-president, and Mrs. Goetz; James E. Ward of Barber-Greene Co., new board member of AAPT; J. Rogers Martin, engineer-director of Oklahoma hot-mix association, new director; Frank M. Williams, retiring board member, and Mrs. Williams; M. F. Macnaughton of Canada, 2nd vice president of AAPT and Mrs. Macnaughton.

Seen at the AAPT Annual Banquet at Atlanta

- Banquet speakers' table: George Dent, past president of AAPT, and Mrs. Dent; J. T. Pauls of BPR, 30-year member of association; Mrs. Carpenter; Carl Carpenter of BPR, AAPT immediate past president.



- Bernard E. Gray, (left) retired chairman of board of the Asphalt Institute (banquet speaker); Mrs. H. G. Nevitt; H. G. Nevitt, president elect of AAPT and L. A. Timms of BPR (30-year member of AAPT).



H. G. Nevitt, 1957 AAPT Head

VIEWS AND COMMENTS

(Continued from page 195)

In addition, attendance of sufficient key men at the national meeting is extremely important. Quite arbitrary limitations by some agencies on such attendance result in definite loss to the organization as well as to the individuals involved.

We recognize the strong pressures, political and otherwise, which tend to restrict such travel. But we likewise believe that more effort is justified to see that those needing such contacts obtain them, with the policing concentrated on seeing that the agency is really benefitted.

Undoubtedly this matter of communications will become more important as the complexity and vol-

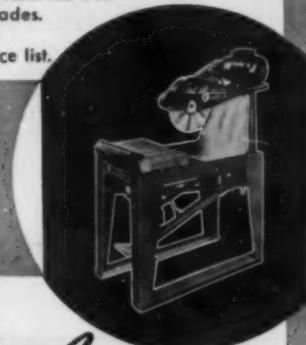
ume of our highway activities increase. A sign of good administration will be the degree to which the organization insures that its communications meet the requirements. The information most cheaply obtainable is that from the other fellow's experiences; but it is necessary to learn about them and know the situation before such knowledge will be of much benefit.



Save 50% or More on
Concrete Cutting Costs
.....
with *Cardinal* ABRASIVE or DIAMOND BLADES

This is a promise, not a rumor! CARDINAL makes ABRASIVE CONCRETE CUTTING BLADES that are break and wear resistant... that actually outperform the best of the standard diamond blades, at a fraction of the cost! And CARDINAL also makes CONCRETE CUTTING DIAMOND BLADES with "king size" segments, maximum diamond concentration, and hi-retention TUNGSTEN CARBIDE bond—that will outdistance and outperform the best of the conventional diamond blades. Between the two there's savings for you! Request folder and price list.

Cardinal "Super-Powered"
MASONRY SAWS
14" and 18"—with Micrometric
Adjustments—Blade Saver
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Amazing LOW PRICE!



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ENGINEERING CORPORATION

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WORLD'S LARGEST MANUFACTURERS OF ABRASIVE AND DIAMOND MASONRY BLADES AND SAWS • DISTRIBUTORS IN PRINCIPAL CITIES

... for more details circle 362, page 16

**NEW YOUNG model 109
BITUMINOUS CONCRETE and
AGGREGATE SPREADER**



Economically Priced
... outperforms more costly spreaders

DOUBLE ACTION SCREED gives extra dense, uniform layer with crown or valley. Positive adjustment of spreading depth from $\frac{1}{4}$ " to 7".

ELIMINATES GUESSWORK IN RADIUS AND ANGLE PAVING. Fits snuggly under dump bed with unique rapid hitch... there is no side slippage when paving around tight curves.

PAVE NEXT TO CURBS AND BUILDINGS. Ideal for driveways and alleys... perfect for wide open spaces.

NEW ASPHALT CURBING MACHINE

A completely new, hydraulically operated machine that won't clog. Puts down compact finished curb that requires no packing. Write for information today.

The YOUNG CO. Box 425 WACO, TEXAS

... for more details circle 359, page 16

**What's New
in Equipment and Materials**

(Continued from page 196)

One-Man Truck Spreader Unit, 5-yd. Capacity

The spreader here pictured is designed for use on an ordinary truck, time required for installation being stated as 15 minutes. It is a one-man unit, with spreader operation controlled by the driver. Width of spread is variable between 8 and 32 ft. at speeds between 5 and 40 mph, according to the manufacturer. Density of speed is controllable and coverage uniform. Spread of materials both in front of and behind rear wheels facilitates operation on slippery grades. Bin capacity is 5 yards. Fox River Tractor Co., Appleton, Wis., is maker.

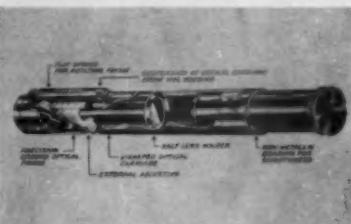


Fox Spreader

For more information circle 141 on Service Coupon Page 16 and mail now.

Improved Lock Hand Level—"Silver City"

To put the modern touch on the long-established lock level design, Stratex Instrument Co., Inc., 3515 Sunset Blvd., Los Angeles 26, Calif., has introduced details shown in the accompanying cut-away view. The cross hair, notes the manufacturer, is engraved on an optical glass index prism which can be adjusted from the outside of the instrument with an ordinary penknife. It is no longer necessary to partially dismantle the instrument or remove the object glass. "Galling" of the eyepiece tube because of metal-to-metal contact in the draw tube bearing is eliminated by use of a non-metallic bearing. For light weight and resistance to weather, the new instrument is fabricated of aluminum, finished in jet synthetic corundum. A "lazy" vial bubble, said to be unique, is a feature. Trade name is the "Silver City."



Stratex Lock Level

For more information circle 142 on Service Coupon Page 16 and mail now.

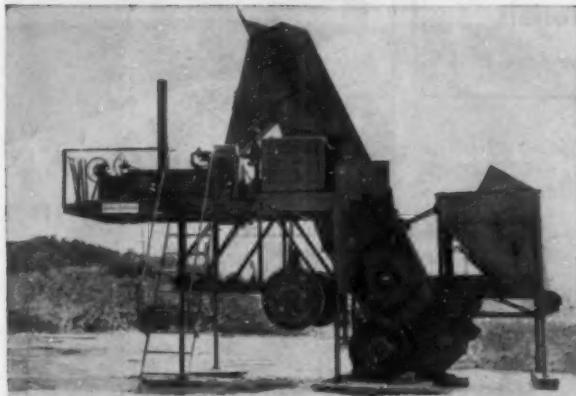
Track Pin Press for Crawler Tractors

A new unit designed to press and replace track pins and to remove and replace bushings without removal of the track shoes has been announced by the Owatonna Tool Co., Owatonna, Minn. The frame and ram assembly mounts on a steel base but can be removed for transportation to the field for on-the-job repairs or overhaul of track.

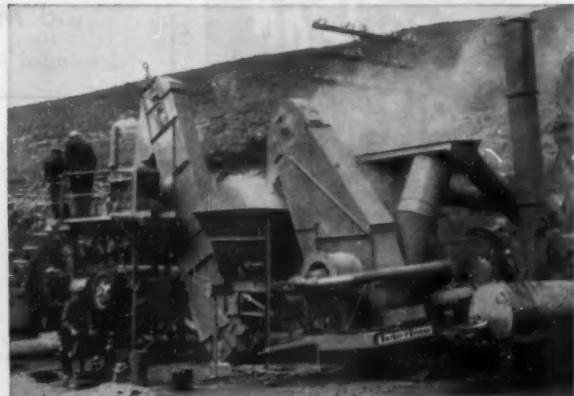
A 35-ton, two-way, single cylinder OTC ram does the pushing. A full $7\frac{1}{4}$ -in. stroke assures complete removal in one pushing cycle. Quick change adaptors snap into the

(Continued on page 200)

Start with an asphalt plant that can grow with your business



Begin with a mixer, elevator and hopper, and you're set to produce stabilized and cold bituminous mixes at capacities of more than 50 t.p.h. For a low initial investment, the Barber-Greene 840-B gives you big plant features and flexibility.



Later add a dryer to produce hot mixes (to 45 t.p.h.) suitable for nearly every type of paving job. With an aggregate feeder to control cold feed gradation, the complete range of hot mixes can be produced—except specs requiring screening after drying.



For high type mixes, expand operations with a gradation unit to produce mixes (to 45 t.p.h.) to meet any specification. A complete line of dust collectors, cold feeders, mineral feeders is available to meet all of your requirements.

Get big plant features with the low cost Model 840-B. A new, longer twin shaft pugmill, hydraulically operated pugmill discharge hopper, interlocked proportioning, speedy setup, unexcelled portability—all provide more production and profit.

56-5A

Now . . . check into this big money maker. Write for literature

Barber-Greene

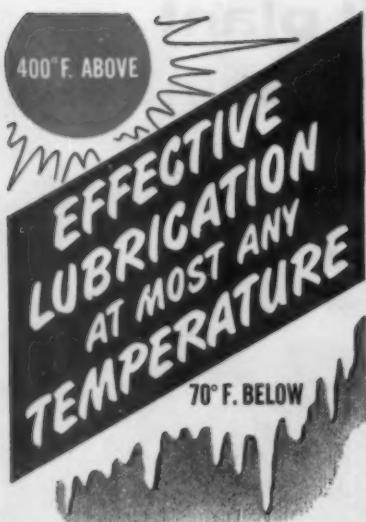


AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT
... for more details circle 247, page 16

ROADS AND STREETS, June, 1957

199



The fact that LUBRIPLATE Lubricants are able to meet extreme temperature conditions demonstrates the ability of these products to cope with the wide variations found in everyday industry. Besides this feature, LUBRIPLATE Lubricants possess attributes not found in conventional lubricants.

HIGH TEMPERATURES

LUBRIPLATE No. 930-AA.—Provides superior and protective lubrication for all types and sizes of machines operating at temperatures as high as 500°F. Possesses exceptionally high film strength and adhesiveness. Protects all metallic parts against rust and corrosion.

LOW TEMPERATURES

LOW-TEMP LUBRIPLATE—The outstanding multi-purpose grease type lubricant that will remain plastic at 70°F below Zero, yet has a Melting Point of 270°F. Resists water and acids—protects against rust and corrosion even from calcium chloride used on paved roads during winter months.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.



... for more details circle 306, page 16

What's New in Equipment and Materials

(Continued from page 198)

ram head or frame head. To facilitate handling of the track, roller conveyor 5-ft. sections may be added.

This press was originally designed for use on John Deere model 40C and 420C and J. I. Case models 200, 300, 400, or 500 as well as model 600 crawler tractors. However adaptor sets for practically every other similar size tractor are available. Designation is "OTC Y-350 Track Pin Press."



Owatonna Track Pin Press

For more information circle 143 on Service Coupon Page 16 and mail now.

Portable Radiotelephone

A new portable AM radiotelephone developed to handle field communication in construction, oil exploration, geological survey, mining, industrial communications, government agencies,



Kaar "Packset"

etc., is announced by Kaar Engineering Corp., Box 1320, Palo Alto, Calif.

(Continued on page 209)



For Low Cost Paving or Patching



McConaughay ASPHALT MIXERS



HTD-800: up to 10 tons hot mix, 30 tons cold mix per hour.



HTD-500: up to 7 tons hot mix, 15 tons cold mix per hour.



HTD-B: up to 5 tons hot mix, 10 tons cold mix per hour.



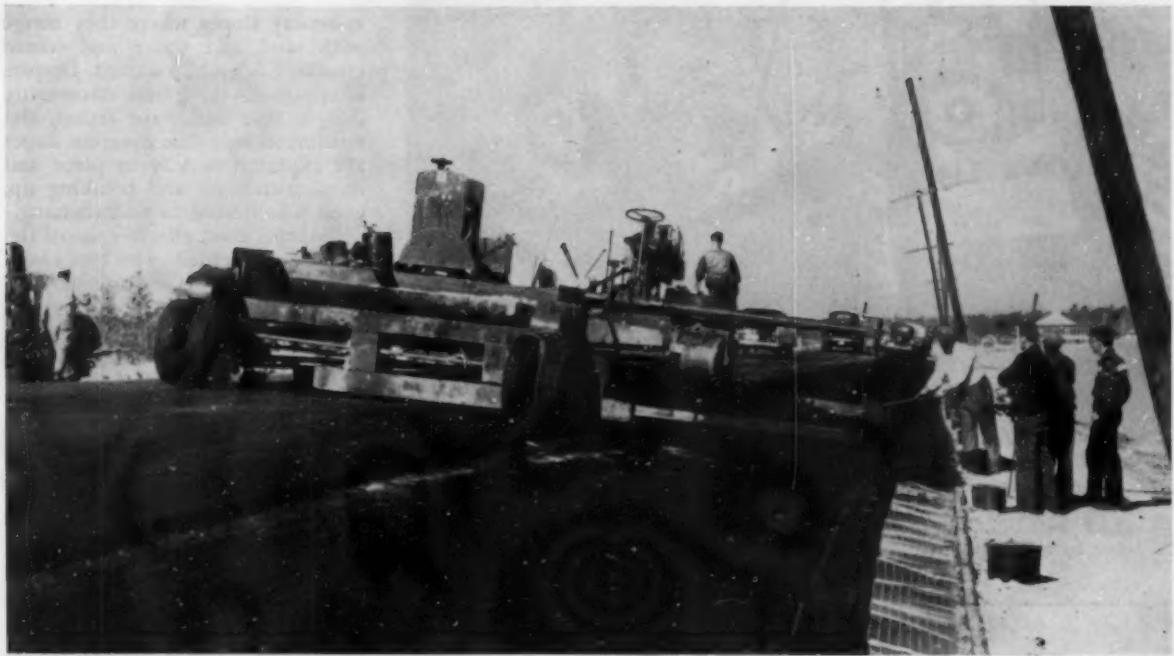
HTD-B TRUCK MOUNT: up to 5 tons hot mix, 10 tons cold mix per hour.

For details and specifications, write, wire or 'phone ..

K. E. McCONAUGHAY LAFAYETTE, INDIANA

National distributors: Asphalt Equipment Co., Inc., 3314 Cherry Lane, Fort Wayne, Indiana

... for more details circle 308, page 16
ROADS AND STREETS, June, 1957



• Blaw-Knox (Apsco) shoulder spreader lays top 2-in. course of asphaltic concrete on slope of Maryland route 5 causeway at Point Lookout.

Causeway Slopes Armored Against Storms with . . .

Fabric-Reinforced Asphalt Mix

The causeway linking the southern terminus of Maryland state route 5 to Point Lookout, where the Potomac River joins Chesapeake Bay, has been rebuilt this past winter and its sea walls strengthened against erosion with fabric-in-asphalt.

The decision to reinforce with welded wire fabric the concrete slopes bordering the 2,000-ft. causeway was prompted by heavy storms which, since 1933, have washed out the road five times.

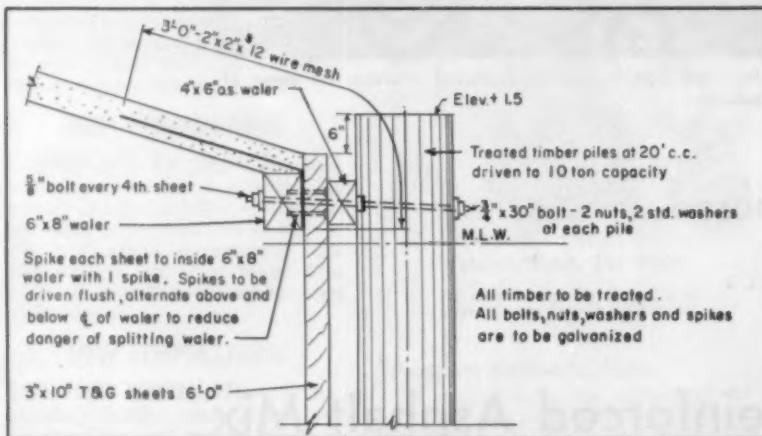
Steel fabric reinforcement was used at the outside edges of the

- Worker adjusts strike-off during mix placement. Fabric in place in foreground was automatically ironed into position.





• Motor grader tows Buffalo-Springfield roller for compaction of fabric-reinforced slopes at Point Lookout. Note pilings (visible just ahead of and behind roller) driven 20 ft. into sand to strengthen cut-off wall on Chesapeake Bay side. Also note storm beatings taken by utility poles.



• Detail of cut-off wall designed to withstand heavy wear by sea.

causeway slopes where they merge with sand and water and where erosion has usually started. Despite alternate covering and uncovering due to tide and wave action, the reinforced asphaltic concrete slopes are expected to stay in place and resist crumbling and breaking up, even if subjected to undercutting.

Assuring most effective use of the fabric—and added protection against erosion—is an unusual cut-off wall construction which ties the fabric and the edge of the slope to the shore.

Six-foot lengths of 3 x 10 treated sheeting were driven deep into the sand to form a continuous, level edging to the completed slope surface. Along the inside face of this sheeting continuous lengths of 2½-ft. wide rolls of welded wire fabric were stapled at the edges so that nearly 2 ft. of reinforcement extended vertically above the top of the sheeting.

Next, 6 x 8 treated battens of walers were bolted to the inside face of the sheeting an inch and a half below the sheeting top, thus securely fastening the fabric between the battens and sheeting. Each sheet was spiked to the inside batten for additional protection against displacement. Four by six walers outside the sheeting were then placed, and walers and sheeting drawn tight by 5/8-in. bolts every fourth sheet. All bolts and other metal fittings were galvanized.

On the Chesapeake Bay side of the causeway the cut-off wall construction was further strengthened

(Continued on page 205)



• Welded wire fabric, style 2 x 2-12/12 (galvanized) in position on Lake Conoy side of causeway, and (right) being bent into position as reinforcement of the top course.





The NEW JACKSON VIBRATORY COMPACTOR

HAS MUCH MORE POWER and
SPEED . . . UNMATCHED ADAPT-
ABILITY TO JOBS OF ALL TYPES!

Here's the machine that will give you maximum density of all materials normally used in macadam base courses and sub-bases with the greatest economy and convenience.

It's a vastly improved version of the Jackson Multiple Compactor which was used with great success on virtually all the nation's important paving projects. It is much more powerful and faster, providing time-saving, full course, single pass compaction. And unmatched as it is for quick and easy adaptability to jobs of all types, it will handle each of them with greatest convenience and least lost motion. Moreover, with this machine you can get into places others can't touch. By all means see your nearby Jackson Distributor (name on request) about this machine or write to us for the complete facts before buying any compactor.

ANY ARRANGEMENT DESIRED OF VIBRATORY UNITS IN THE WORKHEAD TO FIT THE JOB MOST ADVANTAGEOUSLY IS QUICKLY AND EASILY ACHIEVED.

6 UNITS ABREAST FOR MAXIMUM COVERAGE



6 UNITS IN TANDEM FOR MAXIMUM ONE PASS CONSOLIDATION



4 UNITS (or it might be 5) TO EXACTLY FIT JOB WIDTH REQUIREMENTS



5 UNITS IN TANDEM AND STAGGERED.
VARIABLE FOR A WIDE RANGE OF WIDTHS.



4 UNITS TOWED AT SIDE OF
TRACTOR. IDEAL FOR ONE
PASS WIDENING OPERATIONS.



SHOULDER COMPACTION IS AUTOMATIC.
End unit automatically assumes this position — no adjustment required. Prevents raveling.



AND FOR SPOTS OTHERS CAN'T REACH.

Any of the compacting units in the Jackson Vibratory Compactor workhead can be fitted with operating handle and used exactly like the nationally renowned Jackson Manually Guided Compactors. Perfect for getting into odd spaces and close to walls, etc. — spots that can't be reached by other equipment. One man with a twin hookup of two of these units will compact up to 1,200 sq. yds. of granular soils in 6" layers per hour.

JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN

... for more details circle 297, page 16

ROADS AND STREETS, June, 1957



This man has solved a major road building problem

with a **Materials Interchange Plan** . . . Materials availability is a critical problem confronting highway construction authorities. At least one Midwestern state has licked this problem with a *Materials Interchange Plan* that includes Asphalt. Specifications and designs are for alternate types of construction. Roads will be built with materials available at time of construction. No redesigning and rewriting of specs. No delay in the highway building program.

Make this your plan. With a *Materials Interchange Plan* for highways under your authority, roads may be built on schedule from materials available.

Remember these facts: Standard Oil produces Asphalt at four convenient Midwest locations. Tank car and tank truck deliveries are made to you from the Standard Oil refinery nearest your job. Technical Service on Asphalt for highway construction is provided by Asphalt construction specialists who work out of 23 Standard Oil offices all over the 15 Midwest and Rocky Mountain states. Standard Oil has a record of taking care of its customers demonstrated by its delivery on contracts in times of short supply as well as when materials are plentiful.

Get more facts about STANDARD Asphalt from the Standard Oil office nearest you. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

... for more details circle 326, page 16



STANDARD OIL COMPANY
(Indiana)

FABRIC-REINFORCED MIX

(Continued from page 202)

by backing up the sheeting and walers with treated 12-in. timber piles, driven in the sand to 10-ton capacity at 20-ft. centers. Thirty-inch long $\frac{3}{4}$ -in. bolts tied the pilings to the cut-off wall.

Paving of the 4 to 1 slopes was accomplished with Blaw-Knox Appasco Model 85 shoulder spreader. After the first 2-in. course was placed, the steel fabric, which had been originally positioned so that it extended vertically above the sheeting, was bent over into position so that it lay between the base course and the final 2-in. surface course. Bill Kelly, superintendent for the contractor, Bituminous Construction Company of Baltimore, Md., demonstrated "job-rigged" ingenuity with his use of an ordinary lawn roller to "iron" out the fabric as the spreader moved along the shoulder. The spreader placed mix right up to and level with the top of the protruding sheeting.

Slope compaction was done by a small Buffalo-Springfield roller, towed by a Caterpillar motor grader on the level road in order to prevent the roller from digging into the hot, plastic surface.

• The fabric style 2 x 2-12/12, all galvanized, weighing 37 lb./100 sq. ft., was delivered to the project in easily handled rolls. (First demonstration of fabric's effectiveness in asphalt was on a Texas highway in 1945, followed since then by successful installations in many states and cities, with Detroit's Willow Run airport and the Houston International Air Terminal resurfacing with fabric-in-asphalt during the past two years).

The entire causeway reconstruction project, including the reinforced sea walls, encompassed the paving of 34 ft. wide roadway with 3 in. thickness of bituminous concrete. A Barber-Greene finisher was used for this "on the level" work, with compaction by Buffalo-Springfield roller. The hot mix, conforming to Maryland state roads commission specifications, had aggregates 100 percent passing a 1 in. screen, with asphaltic cement averaging 5.97 per cent. It was hauled to the thin-necked Point Lookout promontory 16 miles from the contractor's plant at Lexington Park, near Patuxent Naval Air Station.

Prior to paving, both slopes and

roadway were primed with 0.10 to 0.25 gal. per sp. yd. of MC-1.

With the exception of the cut-off wall construction, pilings, and wire fabric installation, which was performed by M. C. Thompson III, Hollywood, Md., all work was done by Bituminous Construction Company, including grading and joining with the existing road ends. The entire project was completed in 65 working days, early in the winter construction season.

Better protection of the roadway through the more permanent rein-

forcement of the sea walls is expected to save the state of Maryland thousand of dollars in repair and restoration work in the future.

The causeway protection project was conceived and designed by Albert L. Grubb, chief, Maryland bureau of bridges and his assistant, Larry Carr. M. C. Thompson, Jr., resident maintenance engineer in St. Mary's county, represented the state roads commission, of which Robert O. Bonnell is chairman and Norman B. Pritchett is chief engineer.

Standard Steel MODEL 55 Tandem Roller



BUILT LIKE
THE BIG ONES
PERFORMS LIKE
THE BIG ONES



Provides FLUSH CURB Rolling on Each Side

THE MODEL 55 ROLLER was designed to provide two important advantages: (1) Adequate compaction for patch rolling requirements and (2) Ideal roll dimensions for smoothing and finishing work. Ballasting is evenly distributed through the use of both steel and water ballast. Steel ballast is removable in 70# sections providing a wide choice of compaction ranges.

The Model 55 will roll to within 2 inches of wall or building on driver's side and to 4 1/2 inches on opposite side. Eight inch ground clearance provides flush rolling adjacent to curbing. Automatic steering makes easy driving. Up-hoisted seat, safety seat rail, speed control, throttle and foot brake are of motor-car type — and water valve is in easy reach of operator. The maximum weight with all ballast is 4600#. Shipping weight is 3600#. Speed — from 1.75 MPH to 3.5 MPH.

TRAILERIZED FOR EASY TRAVEL FROM JOB TO JOB

Photo above shows ease with which roller is loaded and unloaded from trailer. One man can easily lift and hook it to towing vehicle.

Loading Ramp becomes end gate. Roller locks on trailer for safe travel at all speeds. Write for FREE Catalog and Prices.



Standard Steel Works, Inc., NORTH KANSAS CITY, MO

... for more details circle 328, page 16

One Way to Help the Highway Program:

Give Hot Mix Contractors Better Specifications

A look at some of the inconsistencies in our far-from-standardized specifications, and how they affect the contractor in one of the principal areas of highway work.

By M. C. Ham, Barber-Greene Company

If we are not to stifle the contractor's initiative, if we are to encourage and increase his highway productivity, if we are to enjoy the fruits of free enterprise and of the competitive spirit, if we are to present to the American taxpayer a job we can be proud we will have had a hand in creating—then it is our responsibility to see that we do not sidetrack our objectives by forcing upon the contractor outmoded, obsolete and inconsistent procedure method specifications.

If one were to read the Standard Construction Specifications of the 48 states on hot asphaltic mix construction procedures including those incorporating the materials preparation, the materials drying and heating, the hot aggregate proportioning, the handling of the asphaltic binder, the composite mixing

procedure and the final mixture placing and finishing, he would be amazed at the inconsistencies, ambiguities contained in some of the construction manuals.

We most certainly can help increase highway engineering productivity through more economical and efficient use of asphalt plants and paving machinery. But can we sell that "bill of goods" to the contractor when we plague him with methods specifications which even the "specs" writer often doesn't understand and cannot himself determine the need for?

Reaching a proper balance between end-result requirements and procedure specifications doesn't come easy. Ultimately, when we reach the point where we can specify the kind, the amount and the quality of the given end-product, our standards will be raised and costs will go down.

A few examples of the confusion in specifications:

State "A" maintains an end-result specification, but gives the contractor a break by requiring only 50 seconds in the pugmill.

Specification "C," to be different, requires a 10-second dry mixing period and a 60-second wet mix period.

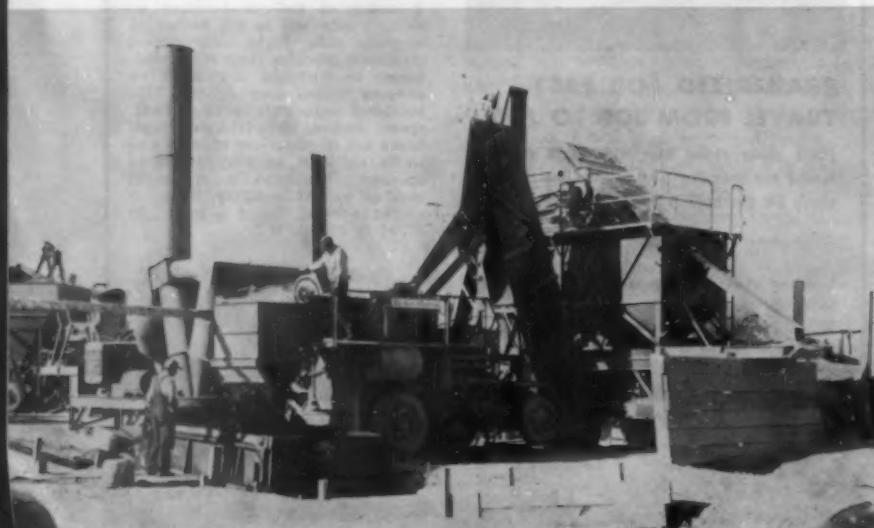
Many states require a 45-second cycle, some a 40-second, some 35-second, some a 30-second cycle. Another state puts no time limit on mixing, leaving it to the responsible engineer to determine when the mix is mixed. There are apparently no lab controls to determine when an asphalt mix is mixed, and since there is no adequate test here, I leave it to you to determine the contractor's reaction when we discuss with him this business of raising his productivity.

● *Let us talk about specification procedures that really get the contractors worked up:*

One specification writer actually confuses the contractor into thinking that he (the contractor) is solely responsible for any change in the penetration of the asphalt binder—if it shows up between that supplied on the finished pavement as compared to that at the mixing plant. Presumably if a reduction in penetration is observed at the pavement (after it is in place) then the contractor doesn't get paid. While the intent may be good, there remains the question of whether it is fair to write a specification placing such

(Continued on page 208)

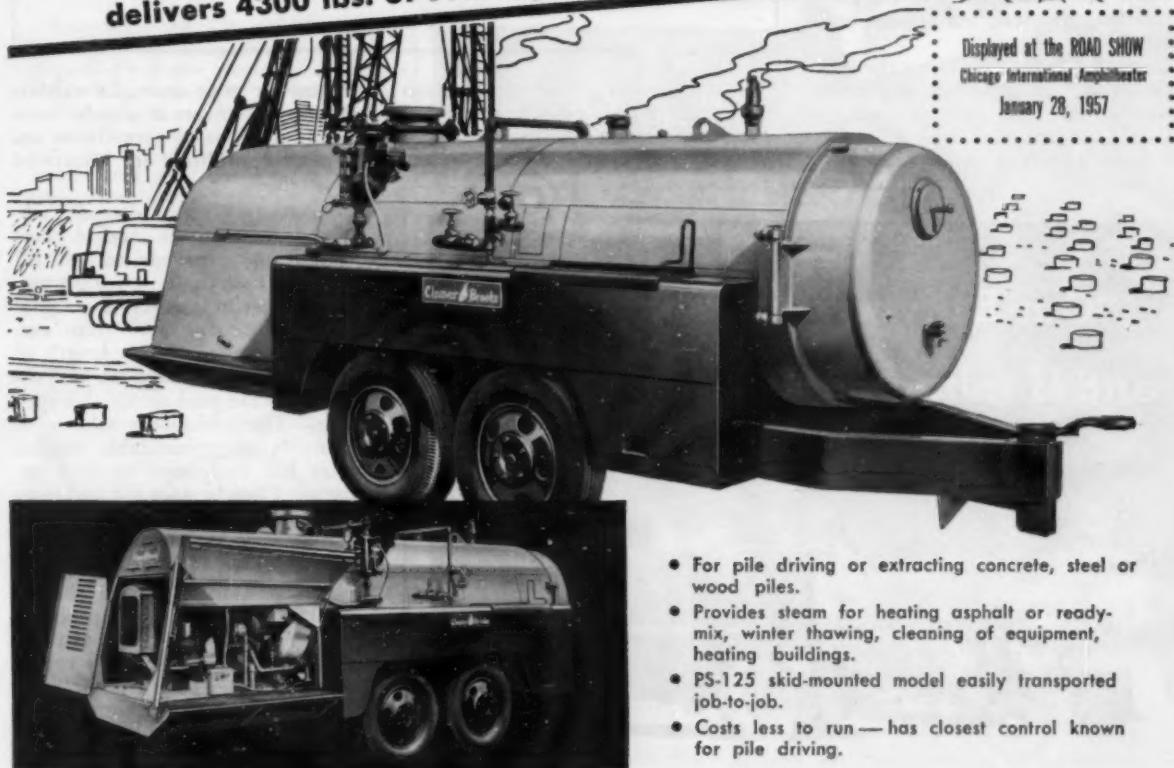
- What daily tonnage (and what quality) of mix this plant or any asphalt plant can produce hinges on many variations in specifications. Many states still need to overhaul their practices so that the contractor can be freed to make fullest use of latest high-production equipment governed by latest thinking of quality control.



Ready to roll, closer control!

delivers 4300 lbs. of 99% dry steam in 30 min. from a cold start

Displayed at the ROAD SHOW
Chicago International Amphitheater
January 28, 1957



EASY TO START, convenient to operate, quick to service

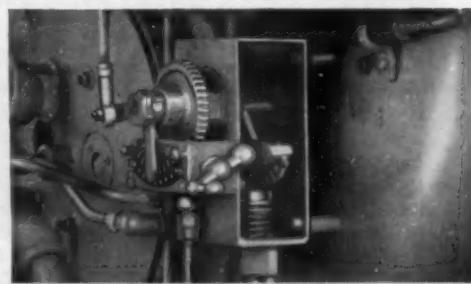
NEW Cleaver-Brooks 125-hp PORTABLE STEAMER easily towed anywhere by truck or tractor

Wherever you need BIG STEAM CAPACITY—roll in the PSM-125. This self-contained boiler plant on wheels can be dispatched anywhere . . . delivers full output in 30 min. Carries its own fuel supply—132 gals. of No. 2 oil in fender tanks.

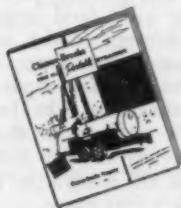
With 99% dry steam, single and double acting pile-driving hammers maintain full rating in maximum number of blows per cycle. Rig maintains pressure continuously . . . delivers on demand, in direct proportion to the load. Plenty of reserve capacity for all hammer sizes.

PSM-125 and PS-125 (skid-mounted) units are all-weather protected and glass-fibre insulated. Rugged, welded-frame construction resists impact. Boiler built to same high standards as Cleaver-Brooks industrial boilers, fully fire-tested at the factory.

- For pile driving or extracting concrete, steel or wood piles.
- Provides steam for heating asphalt or ready-mix, winter thawing, cleaning of equipment, heating buildings.
- PS-125 skid-mounted model easily transported job-to-job.
- Costs less to run—has closest control known for pile driving.



ONE CONTROL MATCHES FIRE TO THE LOAD—
from low to full fire for all steam demands.



TODAY — write for complete data,
including specifications. Ask for copy
of catalog AD-159.

CLEAVER-BROOKS COMPANY

Dept. G, 395 East Keefe Avenue,
Milwaukee 12, Wisconsin

... for more details circle 263, page 16

ROADS AND STREETS, June, 1957

Cleaver  **Brooks**

PIONEERS OF SELF-CONTAINED BOILERS, PORTABLE
STEAMERS, BITUMINOUS BOOSTERS

BETTER SPECIFICATIONS

(Continued from page 206)

control responsibility on the contractor alone. In the cycle of mixing and laying hot mix asphalts in modern asphalt plant techniques today, this specification to the contractor is illogical, ambiguous and unfair.

Another "spec" spells out the procedure on heating and drying aggregates to such an infinite and restrictive degree that the contractor is inclined to think he has to furnish

Our various state specifications can vary the contractor's productivity as much as 50 to 75 percent. This means, in short, that with exactly the same investment in machinery the contractor can produce twice the volume of work in one state that he can in another in the same period.

a coking oven. The specification writer isn't satisfied to remove surface moisture—he is after the internal moisture as well. Extra job time

and cost are most assuredly written into this specification which, from all available testing procedures, accomplishes nothing in improved end product.

Still another state, after describing the temperature and dryness specification, proceeds to get all wound up in actually writing a mechanical specification on the aggregate dryer the contractor must use. Such figures as efficiency, length of dryer drum and cubage are tied up neatly into the package by this spec writer. The contractor asks—with reasonably understandable appeal—what has happened to free enterprise? Then he goes out and buys a dryer to meet the requirements and adds it to his costs.

These are a few examples of the kind of specifications that should be eliminated wherever possible. With no relation to the quality of the finished pavement, they represent an injustice to the contractor, an interference with the contractor's freedom to get the job done in his own efficient way—the way he feels it can be best accomplished at lowest competitive cost.

"Our Etnyre 'Black-Toppers' and Hauling Tanks keep us sold"



Two of 22 Etnyre units operated by Central Asphalt Inc., New Hartford, New York. A 1250 FX 400 Style D "Black-Topper" is shown loading 350-degree bituminous material from an Etnyre Hauling Tank equipped with low-pressure burners.

Recently adding two new Etnyre "Black-Topper" Distributors and a new Etnyre Hauling Tank to bring their fleet up to 16 distributors and 6 transports, Central Asphalt Inc. says, "The fine performance and dependability of the units we are operating keep us sold on Etnyre equipment."

Central Asphalt has used Etnyre "Black-Topper" Distributors and Load-Topper Hauling Tanks extensively in the application of all types of bituminous materials throughout their 11 years of successful operation in central, southern, and southwestern New York State.

Etnyre tanks are originally and exclusively designed and made for handling "heavy" materials. Over and over again, the superiority of these tanks in the special service for which they are designed has been proved by substantial users like Central Asphalt. Learn the details *before* you buy another unit! Call your Etnyre dealer or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

SEE YOUR ETNYRE DEALER

ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS



... for more details circle 275, page 16

What's New in Equipment and Materials

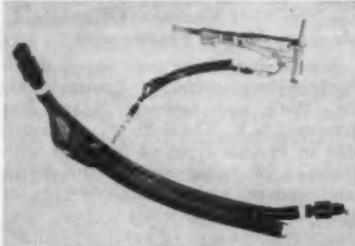
(Continued from page 200)

Designated the TR 246 "Packset," this small radiotelephone is designed to provide reliable communication in areas where unfavorable terrain makes the use of VHF equipment impractical.

Entirely self-contained in a watertight canvas backpack, the Packset can be operated and carried at the same time. Measurements are 12 x 6 x 11 1/8 in. and weight, including full complement of batteries, is 23 lb. There is a base-loaded, 16-ft. telescoping antenna.

For more information circle 144 on Service Coupon Page 16 and mail now.

Pneumatic Tool Lubricator



Bean Lubricator

Bean Rubber Mfg. Co., 1623 S. 10th St., San Jose, Calif., has announced an attachment of flexible neoprene rubber construction for the introduction of lubricant mist into the air line of pneumatic tools. An automatic venturi valve controls lubricant flow into working parts of tool while it is in use; positive shut off works automatically when compressor is not in operation. Oil reservoir holds full supply for 8 hours. Any suitable lubricating oil may be used. Quantity of lubricant introduced into tool is adjustable for different degrees of lubrication. The attachment has been tested to 1800 psi. A major claim of the manufacturer is that the introduction of lubricating oil at tool eliminates breakdown of air hose caused by lubricant introduced at compressor or at other points in the line.

For more information circle 145 on Service Coupon Page 16 and mail now.

Propane Finishing Scree

A propane-heated finisher screed for use with its towed asphalt paver and a special-propane heater for application to its standard floating-crown screed have been developed by Miller Spreader Corp., 4020 Simon Road, Youngstown, Ohio. The addition of heat, notes the company, enables contractors to get an earlier start on chilly mornings

on a ROSCO SELF-PROPELLED ROLLER



YOUR OPERATOR will earn more money for you with Rosco's Model SR-9-0 nine wheel self-propelled, pneumatic tired roller. Here are some of the features that make this machine a real money-maker:

The operator's seat is located for all-around visibility and close operations without "blind spots". Heavy duty, automotive hydraulic power steering reduces operator fatigue...allows more concentration on the job. Ample power for all operating conditions from a heavy duty 4 cylinder, high torque gasoline or diesel engine...multiple speeds forward and reverse...high "over-the-road" travel speeds for fast changes to new job locations.

Rosco's large capacity body is designed for maximum ballast load for proper compaction. Special smooth tread tires provide an evenly rolled path of 69° with overlap. The short wheelbase permits a close turning radius. Drive is through heavy duty, high tensile roller chains and steel sprockets. These are enclosed and running in oil.

This modern, smooth operating SR-9-0 Roller in the hands of your operator will make more profit for you. Ask your Rosco dealer for a demonstration now or write for Bulletin 560B. It contains all specifications and information you'll want to know about Model SR-9-0.



ROSCO BITUMINOUS DISTRIBUTOR with Pressure Metering.
Front or rear mounted for truck or trailer.

Rosco
MINNEAPOLIS

THE BEST FOR BETTER ROADS

3118 SNELLING AVENUE • MINNEAPOLIS 6, MINN.

DISTRIBUTORS • MAINTAINERS • ROLLERS •

SUPPLY TANKS • TAR KETTLES • ROAD SWEEPERS • STREET FLUSHERS

... for more details circle 321, page 16



Heats 16 or More Tampers and Smoothers in 5 Minutes



ASPHALT TOOL HEATER Burns Oil—Burns L-P Gas

For heating tamps, smoothers, shovels, rakes, etc. Starts up quickly—Maintains clean, easy-to-regulate heat without ups and downs—Available with cement heater (shown) or with rack for binder cement pails. Trailer models on pneumatic-tired wheels. Ask for Bulletin 1092A.

HAUCK MANUFACTURING CO.
110-140 Tenth Street - Brooklyn 15, N. Y.

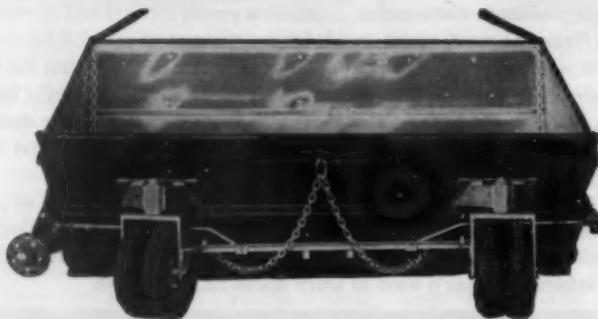
Asphalt and Tar Melting Kettles

Bottom Fired

Speed Master
Tube Fired

... for more details circle 287, page 16

OVERMAN STONE AND BITUMINOUS SPREADER



IMPROVED . . . This all-purpose, low cost spreader is now equipped with pneumatic tires, providing easier steering and moveability, and eliminating vibration and road shocks when towing.

If this spreader is not part of your paving equipment, investigate at once. It's the most efficient, easiest operating paver available, and its low price will surprise you.

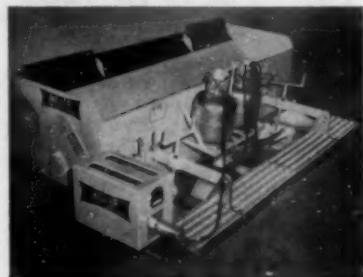
WRITE
FOR
BULLETIN
TODAY

I. J. Overman Mfg. Co.
BOX 896 MARION, IND.

... for more details circle 316, page 16

in spring and fall, insures a better match on joints, permits heat shut-off between truck loads without lost time and fuel and does away with pulling action on fine top or thin patching.

The burners use approximately $\frac{1}{2}$ lb. of gas per hour to produce a working temperature of 250 degrees F. The thermo unit for use on Miller's standard screed is not rigidly attached but simply rests in place without bolting or welding.



Miller Paver With Heated Screed

For more information circle 146 on Service Coupon Page 16 and mail now.

Mercury Vapor Floodlights

A new line of mercury vapor floodlights is announced by Crouse-Hinds Co., Wolf and Seventh, North Sts., Syracuse, N.Y. These lights are available in various types of housings with a choice of beam spreads and beam candlepower, and in lamp ratings of 250, 400 and 1,000 watts.

A particular type of auxiliary ballast, designed to match the lamp type, is required for each size mercury lamp. Constant-wattage type ballasts are available which will regulate the lamp current so that the light output remains constant even with a variation in line voltage from 100 to 130 or 200 to 260 volts.



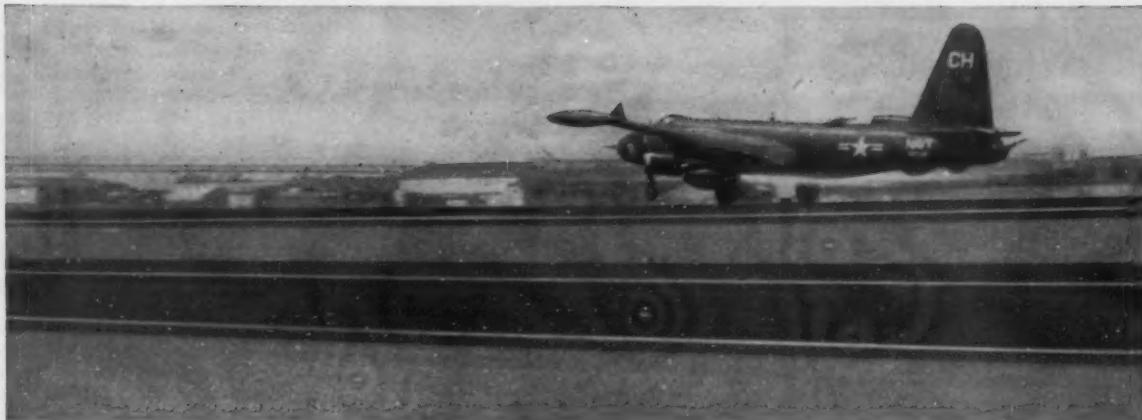
Crouse-Hinds Floodlights

For more information circle 147 on Service Coupon Page 16 and mail now.

Hydraulic Truck Body Hoist

A new conversion hydraulic hoist, designed for installation on $\frac{3}{4}$ -ton and 1-ton trucks, is announced by Galion Allsteel Body Co., Galion, Ohio. Designated Model 443, the new class 6 hoist is suitable for mounting under $6\frac{1}{2}$ to $9\frac{1}{2}$ -ft. pick-up bodies, platform bodies up to 10 ft., or light duty Galion Allsteel dump bodies up to 8 ft. long. Hoist capacity rating is up to 6 tons.

(Continued on page 212)



Navy gets double savings with Bitumuls Slurry Sealing of Runways at Jet Training Station

ONE of the busiest military air installations on the entire West Coast is the Alameda Naval Air Station. In addition to heavy traffic in propeller-driven aircraft, Alameda is an important West Coast jet aircraft training center.

Runway Construction—The runways of this Naval Air Station are surfaced with asphaltic concrete, placed over a 6" course of Bitumuls Sand Mix. The wide shoulders adjacent to these runways are also Bitumuls RS-1 Chip Seal. The surfacing was placed some four years ago, and recently showed signs of weathering. Close

able damage, when scooped into the jet engines.

A Dual Problem—The Navy was looking for answers to two problems: First, a method of revitalizing the runways and extending the life of the pavement surface. Second, a means of cutting down the repair bills involved when jet engines were damaged by loose material scooped up from the surface of the runways. *They found a single answer to both these problems in Bitumuls Slurry Seal!*

Bitumuls Slurry Seal composed of fine, sharp aggregate, Bitumuls Mixing Grade emulsified asphalt and water, was mixed in transit-mix trucks to a free-flowing, slurry consistency. It was applied by the squeegee action of a spreader-box to 350,000 sq. yards of runway and taxi-way. Contract for this work was awarded to George Reed, a contractor from Modesto, California.

To offset the high abrasive action of the aircraft tires on landing, a dilute (3 to 1) Bitumuls tack coat was placed ahead of the Slurry Seal to insure maximum adhesion.

Fast-Fast Application—It was "business-as-usual" at the Air Station while this work was in progress. In spite of the addition-



Bitumuls Slurry is chuted into spreader-box as mix-truck travels at speeds up to 5 MPH.

inspection disclosed some raveling; minor hair-cracks on the surface; and some loose material. This loose material, while of little importance during the days of conventional-type aircraft, had become a major source of expense after jets started operating here. Sand, small stones, and other loose material can cause consider-

... for more details circle 239, page 16

ROADS AND STREETS, June, 1957

al requirement of the tack coat, Bitumuls Slurry Sealing reduced interference with air traffic to a minimum. Planes at the Station were able to taxi over the fresh seal coat four hours after application. Jet aircraft landed on the new seal 24 hours after application.

The costs involved in providing this new life for the existing runway pavement was considerably less than that of a normal seal coat application.

"Meanwhile, at the Hangar..." In the repair shops, an extra "bonus" economy will be realized because Bitumuls Slurry Seal has eliminated loose material from the runways. *The cost of mechanical repairs occasioned by the induction of foreign material through the jet engines is expected to be sharply reduced.*

A Proved Procedure—Bitumuls® Slurry Seal has been proved on many installations—on highways, streets and airport runways—in terms of economy of initial application, and also in terms of durability. It can be applied in any quantity or volume for either construction or maintenance. Call our nearest office if you need additional information. It will be given gladly; and, of course, without obligation.



American Bitumuls & Asphalt Company

200 Bush St., San Francisco 20, California
Baltimore 3, Md.
Mobile, Ala.
Inglewood, Calif.

St. Louis 17, Mo.
San Juan 23, P.R.
Oakland 1, Calif.

Perth Amboy, N.J.
Cincinnati 38, Ohio
Tucson, Ariz.
Portland 8, Ore.

What's New in Equipment and Materials

(Continued from page 210)

depending on body length and pivot. Designed for installation on trucks, with either straight or kick-up frames, having cab-to-axle dimensions from 46 to 60 in., model 443 provides a 45-degree dumping angle. Mounting height is 8 1/8 in.



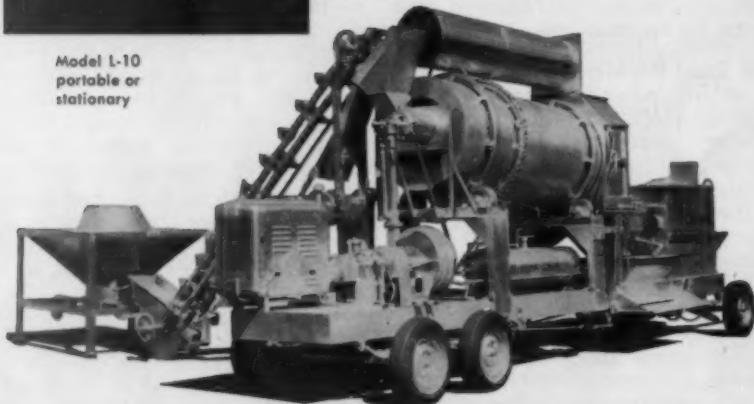
Galion Conversion Hoist

For more information circle 148 on Service Coupon Page 16 and mail now.

White

NEW ASPHALT PLANT

\$13,500 (f.o.b. factory)



20 tons per hour hot mix capacity

Batch type 1000 lb. pug mixer with air-controlled gates. Has built-in asphalt heating kettle, reciprocating plate aggregate feeder. 50 hp engine or 30 hp electric motor. Write for catalog and name of nearest dealer. White Manufacturing Company, Elkhart 2, Indiana.

ONE MAN LOADS . . . ONE MAN OPERATES!

. . . for more details circle 345, page 16

SWENSON SPREADERS Speed Sealcoating!

Spreads Salt or Chloride
for DUST CONTROL or
SOIL STABILIZATION

write for complete
information

SWENSON SPREADER
& MFG. CO.
Lindenwood, Illinois



. . . for more details circle 330, page 16

Hoe Boom for Older Diggers

New optional arched hoe boom attachments for both the type K and Type L machines are now being offered by the Insley Manufacturing Corp., P. O. Box 167, Indianapolis, Ind. Both booms are of the same design, with two vertical sheaves near the boom mid-point and an enclosed horizontal sheave at the bucket.

The attachment for the type K machine has a 16-ft. 9-in. boom, 10-ft. 2-in. arm (hinge pin to bucket teeth), and a digging depth of 17 ft. 6 in.

For the type L machine the boom length is 18-ft. 9-in. arm, 10-ft. 2-in. arm (hinge pin to bucket teeth), and digging depth 19 ft. 3 in. The new boom is adaptable to all type L machines and most type K machines in the field.



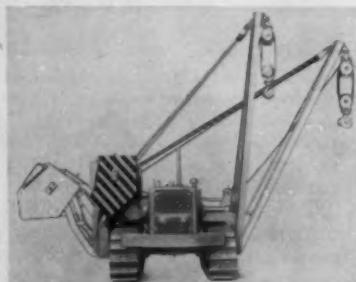
Insley Arched Hoe Boom

For more information circle 149 on Service Coupon Page 16 and mail now.

86,000-lb. Capacity Pipelayer

A new medium-sized pipelayer, designed to combine lifting power with sure stability, has been announced by Caterpillar Tractor Co., Peoria, Ill. Designated the Caterpillar No. 572 "Pipelayer," this machine offers 86,000 lb. of lifting capacity at 4-ft. overhang and an 86-in. track gauge for dependable footing. Ground clearance of 19 in. assures maximum maneuverability.

Features include 128 hp Caterpillar diesel engine; 3-stage torque converter coupled to special low speed transmission; gasoline starting engine; constant power take-off; extra boom safety provisions; hydraulically actuated retractable counterweights; draw-bar with 15 positions available for towing on rear-mounted equipment.



Caterpillar Pipelayer

For more information circle 150 on Service Coupon Page 16 and mail now.

PLANNING YOUR ROADS FOR "FUTURE" TRAFFIC?



In the next ten years you should see some 20 million more cars on the road. This means bigger problems in maintenance, particularly if main streams of traffic have to be re-routed through your community. And one of the most efficient and economical methods of minimizing maintenance problems and increasing the load-carrying capacity of roads is to use Surfa-Sealz.

Surfa-Sealz was specifically developed to eliminate the usual problems in obtaining a rubber-bituminous mix. You don't need to worry about a hot pre-mix or a specially equipped plant. Surfa-Sealz makes every hot mix plant a potential rubber mix producer. And what's more, Surfa-Sealz will not clog or interfere with the operation of conventional equipment.

Surfa-Sealz will bind the asphalt to the aggregate and prevent the asphalt from bleeding to the road surface. This will minimize water penetration, cracking and pot holes.

Surfa-Sealz will stabilize the asphalt by holding in the mix those volatiles which keep the asphalt pliable and resistant to embrittlement. It prolongs pavement life. Try it in your mix. Examine it! Try penetration tests over a period of time and see for yourself how Surfa-Sealz keeps your pavement resilient and stable longer.

For sample Surfa-Sealz®, technical information, and current performance reports, write to us, TODAY.

Surfa-SEALZ

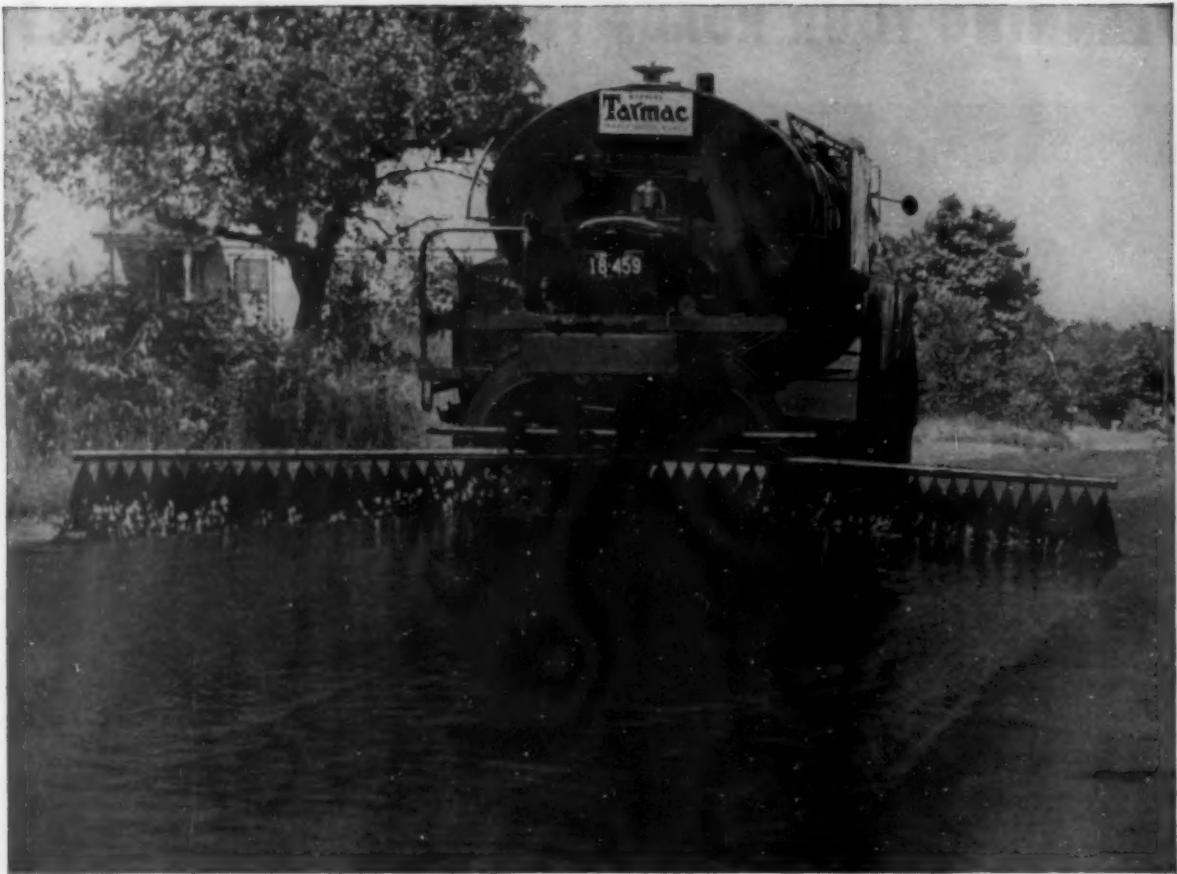


United States Rubber Naugatuck Chemical Division Naugatuck, Connecticut

BRANCHES: Akron • Boston • Chicago • Memphis • New York • Phila. • Mfg.: Los Angeles • Gastonia • Naugatuck • CANADA: Naugatuck Chemicals, Elmira, Ont. Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

... for more details circle 314, page 16

ROADS AND STREETS, June, 1957



There are times when **ONLY THE BEST* WILL DO!**

In prime coats, for example, you've got to have a priming material that penetrates deeply without separation, coats even dusty, fine aggregate particles uniformly, and binds them together tightly. That's why there's no substitute for Tarmac® as a prime coating for new base construction.

After penetration, Tarmac sets-up, binding the entire penetrated depth together into a firm waterproof layer. And Tarmac prime provides a tackiness which promotes an excellent bond between base and surface courses.

There's a copy of the "Tarmac Handbook" that's yours for the asking. For this handy guide to road construction methods, address your request to: Koppers Company, Inc., Tar Products Division, Dept. 124F, Pittsburgh 19, Pa.

*When planning your roads, remember the extra values **TARMAC®** gives you over other bitumens:

1. Faster coating of aggregate
2. Superior penetration
3. Better binding properties
4. Superior moisture resistance
5. Resistance to stripping
6. Self-healing properties



TARMAC®
ROAD MATERIALS

... for more details circle 301, page 16

214

ROADS AND STREETS, June, 1957

HIGHWAY ENGINEERS DESIGNERS DETAILERS

FOR OFFICE WORK IN ST. LOUIS ON HIGHWAYS
EXPRESSWAYS AND ASSOCIATED CIVIL WORKS

- Permanent employment for qualified men
- Ample opportunity for advancement based on merit
- Generous transportation & moving allowances

Plus Employee Benefit and Retirement Plan, Paid Vacations,
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SVERDRUP & PARCEL ENGINEERING CO.
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Industrial Portable Sand Plant in Kansas has opening for a man to assist Superintendent in operation and maintenance of plant machinery and equipment. Knowledge of conveyors, crushing equipment, sand pumps, bituminous sealing equipment and mechanical ability essential. Give references, age and experiences.

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Link Belt - Loran - P&H - Manitowoc.
Shovels - Backhoes - Clam Drag - all sizes.

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PARK RIDGE, ILLINOIS

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- Municipalities
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3	Wagner	75 Kva
1	G.E.	375 Kva
8	G.E.	25 Kva
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2	Westinghouse	117 Kva
1	G.E.	10 Kva
1	G.E.	40 Kva
4	A.C.	15 Kva
3	G.E.	100 Kva
2	Line Material	25 Kva

For Sale by
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GRADING & CONCRETE PAVING EQUIPMENT

1—D-8 Cat Tractor w/angle blade & D.D.P. Unit, S/N 2U5173	\$10,000
1—D-8 Cat Tractor w/angle blade & D.D.P. Unit, S/N 1H8690	7,000
1—D-8 Cat Tractor w/push plate & D.D.P. Unit, S/N 1H6122	7,000
1—D-7 Cat Tractor w/push plate & D.D.P. Unit, S/N 7M4127	5,000
1—Model HD20 Allis Chalmers Tractor & Garwood Angle Blade, S/N H4324	13,000
1—Scraper, Garwood 25 cu. yd., S/N 5231	5,500
1—Model 50 B Bucyrus Erie Full Electric, equipped as a skimmer scoop, w/2 $\frac{1}{2}$ yd. coal bucket, Shop No. 1290	16,000
1—Cleveland Subgrader, pull type multiple blade & Scarifier, S/N 54X68	2,000
1—Slusher McLean Heavy Duty 3 Tooth Ripper, S/N 271	1,000
1—Buffalo Springfield Roller, S/N 21936, 5-B Ton, perfect condition	2,500
1—10 Ton Buffalo Springfield Roller, S/N 18680, w/Wau. Gas engine, perfect condition	3,500
1—Air Compressor, Gardner Denver, 210 ft., Cat Diesel Engine	
1—Air Compressor, Worthington, 105 ft., Wau. Gas engine	
1—DeWalt Radial Saw	400
1—Master Vibrator—Elec.	200
1—Set D-8 Rails & Grousers, pinned, bushed & built up rails & grousers. (2 Complete)	1,500
New D-7 & D-8 Bottom Rollers	
.....80% new price	
1—Gardner Denver Wagon Drill	1,000
1—2 cu. yd. Omaha Dragline Bucket	700
1—2 cu. yd. Esco Coal Loading Dipper —Complete	2,000
1—4 $\frac{1}{2}$ cu. yd. Hendrix Heavy Duty Dragline Bucket	700
1—Buda Herden Earth Drill, with 18" auger, will dig 10' deep hole	1,500

All this equipment in extra good condition and ready to do a job. Should be inspected to be appreciated. All this equipment is subject to prior sale. Contact us for prices on any not priced.

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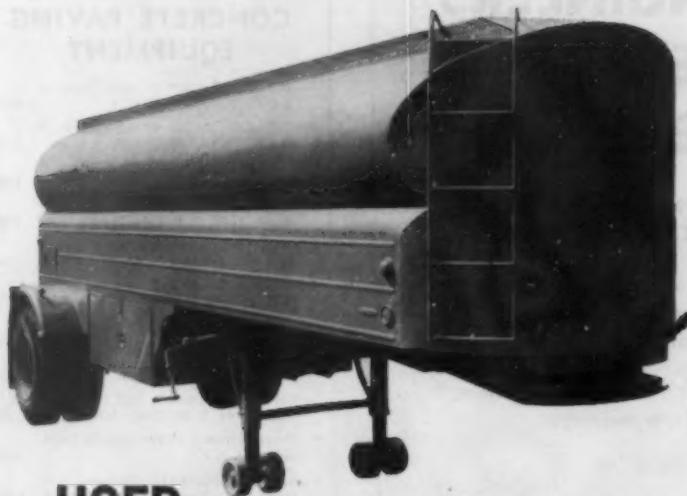
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1954 $\frac{1}{2}$ cubic yard Link Belt, Model LS-50, with 40' boom, backhoe and shovel, front drag and clam buckets, serial #5D-551
One (1) 221 Parson Serial #1709 Trencher.
One (1) Rapid paving breaker, Serial #188.

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5/8" x 12' lg., 18" eyes each end.	3.25
5/8" x 15' lg., 18" eyes each end.	3.75
5/8" x 55' lg., 18" eyes each end.	10.00
5/8" x 60' lg., 7" eyes each end.	11.00
7/8" x 12' lg., 18" eyes each end.	4.00
7/8" x 50' lg., 24" eyes each end.	11.00
1" x 20' lg., 24" eyes each end.	6.50
1" x 45' lg., 24" eyes each end.	10.50
1" x 55' lg., 24" eyes each end.	11.50
1" x 60' lg., 24" eyes each end.	12.00
1 1/4" x 50' lg., 24" eyes each end.	12.00
1 1/4" x 80' lg., 24" eyes each end.	20.00
1 1/4" x 30' lg., 24" eyes each end.	10.00
1 1/4" x 50' lg., 24" eyes each end.	12.50
2" x 40' lg., 24" eyes each end.	15.00

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4—Jaeger 4 1/2 yard High Discharge.
Mounted on Mack Tandems, 70%
Tires, 47" to 49" \$2600 ea.
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2—T5 270 Allis Chalmers Motor Scrapers
2—“C” Tournapulls, each \$9,500.00.
2—“D” Tournapulls, each \$11,300.00.
2—Super C's real buy, each at \$3,600.00.
1—Tournadozer with DD-PCU \$13,500.00.
1—TD24 Dozer, low hours, top shape.
1—HD 15 Dozer, rebuilt engine.
1—Cat. High Lift D7 Leader, rebuilt.
1—Lorain TL20 Back Hoe
1—Osgood 1/2 yd. Back Hoe.
1—Lorain Model L-80, 50' Boom.
1—Vibro Plus CH30 Vibratory Roller
1—HD 20 Tractor with Angle Dozer
1—HD 19 Tractor with Angle Dozer

REDLAC & COMPANY

BOX 41 — PARK RIDGE, ILLINOIS

FOR SALE CONSTRUCTION EQUIP.

2—C Tournapulls, Series 40400, with C Scrapers, Series 60,500, excellent.
2—Euclid S 18, Series 27LTD 19,000, with 27 SH Scrapers, Series 9000, new modification, excellent.
2—Euclid 8 TDT, Series 13,700 with 14 SH Scrapers, Series 6800, completely rebuilt, excellent.
3—DW-10 Cats with #15 Scrapers, Series 1V2600, very good.
2—DW-10 Cats with #10 bottom dump wagons, 9 1/2 yard capacity.
1—Lima 802 Dragline and Shovel combination, D17000 motor, very good. Serial #3168, 70' boom, 32' ext. track.
1—LBO Lorain Shovel and Crane combination, Series 14,600, D13000 motor, rebuilt. Excellent.
4—DW-21 Cats with #21 Scrapers, Series 400, 600; all less than 3100 hrs. Excellent.
2—Euclid 25FTD, Series 3700 and 5800, with 5BW bottom dump wagons, Series 3500 and 4300 Cummins Diesel motors, good.
1—Austin-Western 10x36 Jaw Crusher, roller bearing, excellent.
1—Allis-Chalmers HD9G, Series 740 with tractive shovels, Series 130, excellent.
1—Cat 80 Scraper, Series 5W160, excellent.
1—Cat 70 Scraper, Series 8C2400, excellent.
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1—Cat D-8, Series 2U10700 with #25 cable control, 6600 hours, motor rebuilt, new rails, good condition.
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1—Northwest 25 Shovel Front.
5—2U D-8 Cats with 25 cable control and angle dozers.
5—Oil Clutch D-7 Tractors with 25 cable controls and 7A and 7S blades.

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1500# Batch Hot Mix Asphalt Plant complete. All electric, good condition. Priced to sell. Contact us for more information.

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The following available, subject to prior sale, located in our yard only five minutes from the Public Square. All equipment in excellent condition, ready for work and is as represented.

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B-E 108 #20334 with Buda 6 cylinder gasoline motor, backhoe and shovel front, 3/4 yard capacity, F.O.B.	6,500.00
B-E 15-B #33264, Chrysler Industrial 8 cylinder motor and backhoe, F.O.B.	8,500.00
OSGOOD 200 #4334, Chrysler Industrial 8 cylinder, 30' boom, 1/2 yard, F.O.B.	4,000.00
OSGOOD 200 #4226, Buda 6 cylinder gas, 30' boom, 1/2 yard, F.O.B.	4,000.00
OSGOOD 50 #5907, Buda 6 cylinder gas, backhoe, 30' boom, F.O.B.	5,000.00
OSGOOD 705 #3549, 1 Yard, Buda Diesel, UNUSED, F.O.B.	17,500.00
OSGOOD 800 #3411, 1 1/2 Yard, Cat D-13000, 50' boom, 600 hrs.	20,000.00
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LINK-BELT LS-75 #11873, Chrysler Industrial 8 cylinder, 35' boom, 3/4 yard, F.O.B.	10,000.00
LINK-BELT LS-50 #5197, Buda gasoline, 6 cylinder, 30' boom, F.O.B.	5,500.00
KOEHRING 304 #3938, Chrysler 8, 35' boom	9,500.00
LINK-BELT LS-75 Cat 4600, Backhoe	10,500.00
B-E 22B #97886, Cat. 318 diesel, dragline	16,500.00

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TAMPCO Compactors, Pneumatic Tires, F.O.B.	1,200.00
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GENERAL 320 Backhoe (1954) 2 Buckets	2,500.00
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VULCAN AND McKIERNAN-TERRY
Steam Pile Hammers and Extractors
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94	MP-116	34 to 35 ft.	Wisconsin
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- 4—ALLIS-CHALMERS Cable Dozers, GarWood Cable Blade, 281 PCU HD-20, S/N's 5410, 5458, 5503, 3881.
- 1—ALLIS-CHALMERS HD-20, Tractor, Tractor-tow push plate, GarWood PCU 281, S/N 5544.
- 1—ALLIS-CHALMERS HD-15 AC Doser, Torque Converter, S/N 2984.
- 3—ALLIS-CHALMERS HD-15 AC Cable Doser Torque Converter, GarWood Cable Blade, 281 PCU, S/N's 2993, 2998, 2999.
- 2—LIMA 1201 Dragline/Crane, "L" Cummins Diesel, 44" treads, long crawlers, 80' dragline boom, high gantry, S/N's 325812, 328130.
- 1—LIMA 1201 Dragline/Crane, Model "L" Cummins Diesel, 40" treads, long crawlers, 80' dragline boom, high gantry, S/N 329514.
- 2—M & W 18" x 22' Loe Head Water Pumps, 4-71 GM Diesels, S/N's 26123, 26124.
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- 2—GARWOOD 620 Scrapers, 17 cu. yd., S/N's 239, 225.
- 1—CASE Industrial Tractor LA-1, S/N 5424348-LA.
- 1—PAGE 3 cu. yd. Dragline Bucket, S/N 10-626.
- 2—ESCO 3 cu. yd. Perforated Dragline Bucket, S/N's 30222, 30189.
- 4—HENDRIX 4 cu. yd. Perforated Dragline Bucket Type LS—S/N's 19151, 19100, 19153, 19063.

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1949 Lima 34 Paymaster with shovel front and backhoe attachments.

1955 D4-60 shovel loader with D4N towing winch (like new)

Bucyrus-Erie 170A Scraper (like new)

#80 Caterpillar Scraper with sideboards (like new)

37B Bucyrus-Erie 1½ yard shovel with Continental diesel.

TD24 with straight bulldozer and double drum control winch.

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Butler Concrete Batch Plant, Complete Two V50 2-compartment aggregate bins Cement bin and storage bin Complete with undertrack screw, cement elevator, and twin scales. Can be converted easily to automatic operation.

2—Model C-Tournapulls Serial #GM-9T3790-CR & GI-4706—FCR-W have been used very little. Rubber fair on one—Excellent on other.

D-7 HI-LIFT, S.N. 378441

Tri-line Concrete Saw, S.N. TL-A-105

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We Repeat
These units are priced for quick sale

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Write, wire, or phone collect

FOR SALE

1—Euclid Model S-7 Motor Scraper, like new. Total operating hours a little over 1000 hrs.

3—Model Super C Tournapulls. Good tires and in perfect operating condition.

2—D. Tournapulls 1956 Models. Guaranteed like new.

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Barber-Greene Finisher Model 879-A Serial 45-56 Less than one year old Has run only 39,000 tons on Oklahoma Turnpike—perfect condition with new augers—only \$12,000.00.

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JAEGER	

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1—5" Gar. Denver	\$ 950
1—Berkeley 1000 GPM	2000
4—GE 800 GPM	400
1—Deming 400 GPM	850
1—Deming 250 GPM	700
1—Deming 400 GPM	680

All Pumps Complete
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or

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1—Model XC Transverse Finisher, size 10' to 15', new 1946, completely overhauled 1955 and not used since.	
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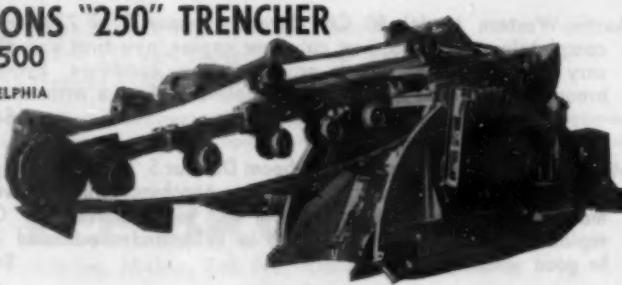


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1 Bay City Shovel, 3/4 yard	1949
1 LeRoi Air Compressor 365	1953
1 Ingersoll-Rand Wagon Drill	1952
1 Koehring Dumpster	1955
30x30 Impact Breaker	1952
Apron Feeder	1951
3 UD-18 Power Units, standard equip.	1951
1 UD-18 Power Unit with V belts	1951
Pioneer Roll Crusher	1951
1 Caterpillar Dozer, D6	1954
HD-5 End Loader, A-C	1955
1 Welder on rubber	1954
1 International Dump Truck	1954
1 Ford Dump Truck	1952
1 Keo Dump Truck	1952
1 Arc Welder	1952
1 Steel Bin and one 3/4 Screen	1954
1 Set of Howe Scales	1951
Scale House and Office Equipment	1951
Machine Shed and one lot of Tools	1951
One 100 Ft. Conveyor, 30 inch belt	1951
One 29 Ft. Conveyor on rubber	1947
One 16 Ft. Conveyor	1947
2 Electric Motors, 5 H.P.	1952
2 Briggs & Stratton Motors	1954
1 A.C. Motor with sheave, 25 H.P.	1953
One Concrete Bin, three sections, cap. 300 tons, new in 1952	
One Thousand Gallon Diesel Tank	
One Lot of Material in stock pile	

With UD-18 Power Unit

Size 22 x 44

Weighs 24 tons

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34-E Double Drum

A-1 Condition

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SALE OR RENTAL — 25 TON CRANES
MANITOWOC 2000B Erection Crane, Independent Boom Hoist, Manual Controls, 14'-7" Crawlers, 30" Treads, Extra Counterweight, Serial No. 22162, "Diesel".

BUCYRUS-ERIE 38B Erection Crane & Dragline, Independent Boom Hoist, Fairleads, 13'-6" Crawlers, 33" Treads, Serial No. 102742. Caterpillar D13000 Diesel Engine.

BOTH MACHINES GUARANTEED
EXCELLENT CONDITION

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3—Gar Wood 625 Scrapers, 25-yard capacity
 4—Caterpillar D-8 Tractors with Allis-Chalmers 315 Scrapers
 Tractors are late serial numbers and in excellent condition. Scrapers are like new.

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CEDARAPIDS MODEL 3030 IMPELLER BREAKER

With Feed Chute and Chain Curtain. 30 x 48 H. D. Vibratory Grizzly (2" openings) with "V" Belt Breaker Drives. Serial Number 14766.

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USED EQUIPMENT

1—Allis-Chalmers HD-15 Dozer, 1 hydraulic. Top condition.
 1—Cat. 212 Grader, tandem drive. Excellent condition.
 1—Adams 660 Grader, Cummins engine. Top shape.
 1—3½-yard Buckeye Combination Shovel and Drag. Good condition.

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 Ph. Prospect 1-0292

"MANITOWOC" SELF-PROPELLED WAGON CRANE

Model 3000, 2 yard, 40-50 ton capacity; 88' boom; 15' jib; powered with GMC 671 diesel. Unit mounted on 16-14.00 x 24 pneumatic tires, 4 axle in tandem. Overall width 15'2" - Overall length 29'5".

Tinkler Equipment Co.
 2590 Oakdale Avenue
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FOR SALE

1—Willard Batching Plant Model GL—S/N 188 with Weigh Batcher and Ford Industrial 6-cyl. and Willard 24' Batch Conveyor, S/N 171 with 5 hp Electric Motor.
 1—Badger Model 303-3 Ditcher, S/N 374 Crawler mounted, good operating cond.
 1—Buckeye Model 120 Ditcher with Buda Model HD325 Gasoline Engine - 2 sets buckets - good operating condition.
 1—Hyster Model HW-Hystaway Dragline and Crane attachment, S/N 23628 for mounting on Caterpillar D7 or D8 - like new.
 1—Allis-Chalmers Model HD19G, S/N 2046 with 4 cu. yd. Front End Loader with Standard Bucket and Rock Fork. This tractor completely overhauled - new tracks, rollers, sprockets, idlers and engine, torque converter, transmission overhauled, new jack assemblies in loader - This tractor is in perfect condition.
 1—International Model TD14 tractor, S/N 10883-T4 with 180° swinging boom crane model MC2R, S/N 4686.

Pictures available - write, wire or phone.

BORCHERT-INGERSOLL, INC.

2161 University Avenue
 St. Paul 14, Minnesota

FOR SALE

Allis Chalmers Model TS200 S/N T200-2153, traction tread tires, bucket seat & cab.
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 Bakers Model SFD 96 Sheepfoot roller (double) S/N 237.
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 D-8 Dozer, S/N 2U19042 SP with 8A Dozer S/N 7A4584 X25DDPUC S/N 9D23144.
 1950 La Plante Cheate Wagon, S/N C-314-488, 12-15-C.Y. Capacity.

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380 pcs. BETH. 1P4 — 20' to 40'
 462 pcs. AP3 — 21' 25' and 30'
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 416 pcs. ZP32 — 25' 37' and 50'
 1300 pcs. MP101 — 45' and 60'
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15 x 24 PORTABLE CRUSHER
 MODEL 15 A DIAMOND CRUSHING
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Outstanding EQUIPMENT BUYS!

"CAT" No. 12 Diesel Motor Grader
8T series, completely equipped with complete cab and good tires. Has been completely rebuilt with genuine Cat parts and is warranted—\$11,500.00

"CAT" No. 12 Diesel Motor Grader
7T series, fully equipped and with cab and good tires. Carries a "Buy & Try" warranty. Here is a good motor grader priced at just—\$5,250.00

Adams 550 Diesel Motor Grader
Has large tires in good condition, complete cab, Adams snow wing and plow. 1952 model in good mechanical condition with a "Buy & Try" warranty—\$6,500.00

"CAT" D8 Diesel Tractor
Another 2U series equipped with sticks and No. 25CCU. Completely rebuilt in our shops and fully warranted—\$18,500.00

"CAT" D8 Diesel Tractor
2U series with a "Buy & Try" warranty. Has sticks and Cat. No. 25 CCN. In good condition and priced at just—\$9,500.00

"CAT" D8 Diesel Tractor
Equipped with No. 25 CCU and 85 dozer. 2U series which has been completely rebuilt in our shops and carries our "Bonded Buy" warranty. A real buy at just—\$11,000.00

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EUCLID TRUCKS — Rear and Bottom Dumps.

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ROGERS 35 Ton LOWBED TRAILER

Spare parts for 120B & 9W Bucyrus-Erie

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2—42' conveyor. One conveyor 155' long; the other 160' long. Used 7 months.

1—McCully gyratory crusher #11.

1—Marion electric shovel, Model 6RS.

Numerous other units including ½-yard to 2½ yard shovels; Murphy & GMC power units & generator sets. Screens, jaw crushers, rolls, bucket elevators, etc. Some units mounted on rubber-tired chassis.

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FREIGHTLINER C-O-E DUAL DRIVE TRUCKS

Several to Choose From . . .

- Cummins & Buda Diesel Engines
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Some available with Truck Tanks, others chassis only. These lightweight, heavy duty trucks can be used as a truck or for a long wheelbase tractor. All in good mechanical condition.

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—these trucks are really clean. This equipment will be sold with or without truck tank and two axle trailer and tank.

40-ton Capacity

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Manufacturers' Literature

Tractor Operator's Manuals

Eimco Corp., 634 S. Fourth West, Salt Lake City, Utah, announces two new manuals for operators of Eimco model 105 tractors—the Eimco tractor-excavator and the Eimco model 105 front end loader. The 24-page brochure on the tractor-excavator offers tips for efficiency in operation of the tractor as well as detailed information on preventive maintenance. It is illustrated with numerous pictures emphasizing the role of the operator in obtaining maximum performance and usage. The front end loader booklet (B-L1056) is a 4-page illustrated pamphlet which also outlines efficient operation of the attachment recently put into production as an additional tool for the basic model 105 tractor.

For more information circle 160 on Service Coupon Page 16 and mail now

Power for Pumping

A new 12-page power selection handbook, "Selecting Power for Pumping," has recently been released by Caterpillar Tractor Co., Peoria, Ill. It contains a checklist of features necessary for

continued dependable operation on pumping jobs. Step by step, the list describes the proper requirements which an engine must have, backing them with illustrations and examples of efficient installations. "Selecting Power for Pumping" is an aid to anyone who wishes to match the proper engine to his pumping requirements. Ask for form No. DE716.

For more information circle 161 on Service Coupon Page 16 and mail now

Utility Bituminous Sprayer

Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J., has issued a description and specification sheet covering its new 909-7 utility sprayer in detail. Tank capacity is 600 gal.; heating by propane, butane, or kerosene, with quick change of fuel type if desired; spray bar 8 ft., with 10 and 12-ft. lengths available—all with half-length cut-off when wanted; bar side-shaft is 9-in. plus or minus; nozzles are dual, individually controlled; hose and hand spray for irregular areas, two sprays operable at one time; pump Viking rotary, 90-gpm capacity.

For more information circle 162 on Service Coupon Page 16 and mail now

Use of Steel Forgings

The AmForge division of American Brake Shoe Co., 230 Park Ave., New York 17, N. Y., has published a new 16-page booklet on the application of steel forgings. Well illustrated, this

brochure also depicts research, engineering, and production facilities for drop, press and upset forgings.

For more information circle 163 on Service Coupon Page 16 and mail now

Motor Grader Operation

Working advantages provided by the Allis-Chalmers model 45 motor grader are covered in a new 16-page 2-color catalog (MS-1148) now available from Allis-Chalmers Manufacturing Co., Construction Machinery division, Milwaukee, Wisc. Photographs, sketches and other illustrations aid readers to visualize details of the motor grader's mechanical features and components. On-the-job photographs further assist in telling the performance, operating, comfort, and service simplicity of the "Forty-Five." The catalog also tells about attachments and accessories that add to the versatility of the unit, and includes its specifications.

For more information circle 164 on Service Coupon Page 16 and mail now

Diesel Trouble Shooting

If you are having trouble with a specific piece of equipment, what do you do? A bulletin just released by the service division of Cummins Engine Company, Inc., Columbus, Ind., recommends that, first, you "think before you act." Then ask yourself these questions: (1) What were the warning signs preceding the trouble? (2) What

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previous repair and maintenance work has been done? (3) Has similar trouble occurred before?

The bulletin is entitled "Principles of Trouble Shooting for Cummins Diesels." It is designed to unfold so that it can be used as a wall chart on which complaints are listed and probable causes noted.

"Trouble shooting," according to the bulletin, "is nothing more or less than an organized study of the problem and a planned method of procedure for the investigation and correction of the difficulty." The chart includes some of the most common complaints that may be encountered during the service life of a diesel engine.

For more information circle 165 on Service Coupon Page 16 and mail now

Batching Accessories List

Engineered Equipment Co., Waterloo, Iowa, has just announced its revised line of accessories to help solve materials storage and batching problems. Some of these items are:

Material batchers and batching bins, single or multiple batching—any size, built to specific requirement; plug valves and vane feeders for positive cement control; bin indicators and signal box to indicate the level of cement in storage; aggregate gates of all types for unloading hoppers, belt charging and feed metering. Also available are cement aeration assemblies, cement and aggregate receiving hoppers and 2 and 3-way cement valves.

For more information circle 166 on Service Coupon Page 16 and mail now

All-Weather Asphalt Additives

A new line of all-weather asphalt anti-striping additives being introduced by Armour and Co., chemical division, is described in a booklet called "Radicote." These additives are ready-to-use chemicals which may be added at the asphalt plant or can be put directly in the mixer with the aggregate and asphalt on the job.

Details on the uses of the new line of additives are given in the 12-page brochure which describes the three products, Radicote 2323, Radicote 2370 and Radicote 75. The booklet also covers various state test procedures against which the Radicote products were evaluated. These include the Massachusetts heat, Pennsylvania wet coating and Ohio striping tests.

For more information circle 167 on Service Coupon Page 16 and mail now

Transit Mixer

The "TED (truck engine drive) Transcrete" is described in a new bulletin of Construction Machinery Co., Waterloo, Iowa. Featured are the simple and flexible drum drive connections; fuel economy and low maintenance cost; efficient handling of mix of any slump characteristic; adaptability to mounting on a wide variety of trucks; smooth operation; standard

automotive replacement parts; the Transcrete floating drive and Transcrete swing-out hopper.

For more information circle 168 on Service Coupon Page 16 and mail now

Tractors and Equipment

John Deere & Co., 400 19th St., Moline, Ill. Thirty-two-page catalog covering crawler tractors, wheel tractors, dozers, backhoes, front end loaders, side booms, trenchers, sand and chemical spreaders, mowers, snow blowers and other items. Tractor dawbar hp ratings are 24.12 for the crawler and 27.08 and 18.0 for the 2-wheel tractors. Specifications are given for tractors and all major items.

For more information circle 169 on Service Coupon Page 16 and mail now

Hi-Way Widener Catalog

A new 4-pg. catalog covering the Gar Wood-Buckeye Hi-Way widener is now available from Gar Wood Industries, Inc., Customer Service department, Wayne, Mich. The Hi-Way widener excavates and finish-grades a highway widening trench in one pass. Requiring only one man to operate, it digs a clean, flat-bottomed trench, ready for concrete or bituminous material. Pouring can be done without forms or with outside forms only.

For more information circle 170 on Service Coupon Page 16 and mail now

WINCO Gives You
NEW ECONOMY

IN
PORTABLE ELECTRIC POWER

WITH THE EXCLUSIVE NEW

Automatic CONSERV-er

IDLING CONTROL

Extends Engine Life
Reduces Fuel Consumption
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Plant automatically idles until load of 75 watts or more is applied. Automatic CONSERV-er reduces engine to idling speed when tool is turned off, revs up to operating speed when tool is turned on—all automatically. Get all the facts on this money-saving Winco feature. Write Dept. RS-67

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... for more details circle 364, page 16

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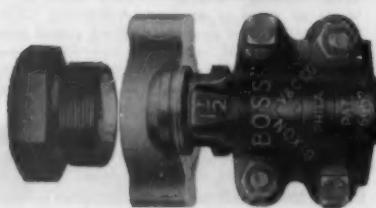
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... for more details circle 357, page 16

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GROUND-JOINT
FEMALE
COUPLING
STYLE X-34



The original washerless coupling that is unequalled for safety in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal...no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes $\frac{1}{4}$ " to 6", inclusive.

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... for more details circle 271, page 16

With the Manufacturers and Distributors

WHEELER MACHINERY CO., J. K. Wheeler, president, has acquired the business of Wheeler-Kershaw Co., 245 W. South Temple, Salt Lake City, Utah, and of Rental Equipment Co. The new company will concentrate on products of Caterpillar Tractor Co. and associated lines. The old organization remains intact.

ATLAS POWDER COMPANY, manufacturer of explosives and chemicals, this year will add two Atlas Merit scholarships to the company's college student assistance program, now in its fourth year. Winners will be selected by the National Merit Scholarship Corp.; this group held competitive examinations last fall in high schools throughout the country. The Atlas awards will also release matching funds for two additional scholarships, bringing to four the number of scholarships actually made possible by the Atlas Merit scholarship grants.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago, Ill., has announced the appointment of R. K. Annis to the company's engineering division as development engineer. Mr. Annis, who was formerly assistant to the manager of the company's Kansas City, Kans., works, will be located in Chicago headquarters.

BROS INCORPORATED. Observing its 75th anniversary, the name of Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn., has been changed to Bros Incorporated. "This change," explained Raymond J. Bros, president, "does not affect our present or anticipated manufacturing and marketing plans; rather, it better represents the scope and outlook of the Bros company in terms of its diversified product lines and sales in the expanding national and international markets."

BLAW-KNOX CO., Pittsburgh, has announced the appointment of Bruce Alexander as manager of technical services at its office in Washington, D. C. He succeeds Marvin Marcus who has represented the company in Washington since 1945 and resigned to establish his own business as a Washington consulting engineer.

WILLIAM O'NEIL, president of General Tire & Rubber Co., has announced the election of Michael Gerald O'Neil as vice president and executive assistant to the president.

Howard A. Bellows, vice president since 1952, has left the parent company to become General Tire's distributor in Philadelphia.

CHANGES AT ALLIS-CHALMERS. Henry Larsen has been appointed assistant

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your industrial distributor
about Hammerlok.

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the original alloy steel chain.

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DISTRICT OFFICES: NEW YORK
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In Canada: McKinnon Columbus Chain Limited,
St. Catharines, Ontario

... for more details circle 351, page 16
ROADS AND STREETS, June, 1957

general works manager, tractor group, Allis-Chalmers Manufacturing Co., Milwaukee, Wisc. He succeeds Owen J. Higgins who was recently appointed general manager of the Harvey, Ill., works.

THE ESSICK MANUFACTURING CO., Los Angeles, Calif., and Elizabeth, N. J., has announced the appointment of William C. "Bill" Allison as its district representative in the following midwestern states and Canadian provinces: Illinois, Indiana, Iowa, Michigan, Minnesota, North Dakota, South Dakota, Ohio, Wisconsin, Saskatchewan, Manitoba and western Ontario.

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Building Const. Mech'l Drawing Electricity, AC
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... for more details circle 302, page 16

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served in a way that
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ADAMS & CLINTON
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Charge. Approved AAA, Duncan Hines.

GORDON N. Dow has been appointed general sales manager of Leschen Wire Rope division, H. K. Porter Co., Inc., according to an announcement by Emmett H. Mann, vice president and general manager.

THE COLORADO BUILDERS SUPPLY CO., 1534 Blake St., Denver 2, Colo., has been awarded an exclusive distributorship by the Parsons Co. for Colorado and Wyoming.

NEW VP'S AND PM FOR WAUSAU. R. J. Heinzen, president of Wausau Iron Works, Wausau, Wis., announces new personnel for the firm: N. R. Gahm, vice president, sales; R. H. McMillan, vice president, manufacturing; William Johnson, production manager.

APPOINTMENT OF DALYRYPMLE EQUIPMENT CO., Amory, Miss., and Memphis, Tenn., as the Buffalo-Springfield distributor for all of Mississippi and Arkansas and for western Tennessee has been announced.

PETER V. MOULDER, president, International Harvester Co., has announced the appointment of Ralph M. Buzard, formerly manager of sales, motor truck division, as general manager of that division; Louis W. Pierson, formerly assistant manager of sales, motor truck division, was promoted to manager of sales, succeeding Buzard; William E. Callahan, formerly sales manager, eastern region, motor truck division, was appointed assistant sales manager in which capacity he will serve along with D. F. Kuntz, whose appointment was announced in 1956.

GEORGE C. JENNINGS has been appointed New York district sales manager of the Wickshire Spencer Steel division of Colorado Fuel and Iron Corp., it was announced recently by L. A. Watts, general manager of sales, eastern division. Jennings succeeds C. K. Pattison, who will handle special assignments for the corporation.

SISALKRAFT of Attleboro, Mass., maker of paper for curing concrete and other products, has announced acquisition of controlling interest in Pavement Controls, Inc., Cleveland, Ohio. The latter firm has supplied services and products for concrete joint sawing, joint filling and other services in connection with concrete paving.

JOHN E. ANGST, formerly vice president of western region sales for the American Car and Foundry division of ACF Industries, Inc., has been appointed vice president in charge of marketing for the entire division. H. H. Rogge, executive vice president of the division, who made the announcement today, said that the post has been newly created and that all personnel in sales, traffic, export, market research, advertising and sales promotion will report to Mr. Angst.

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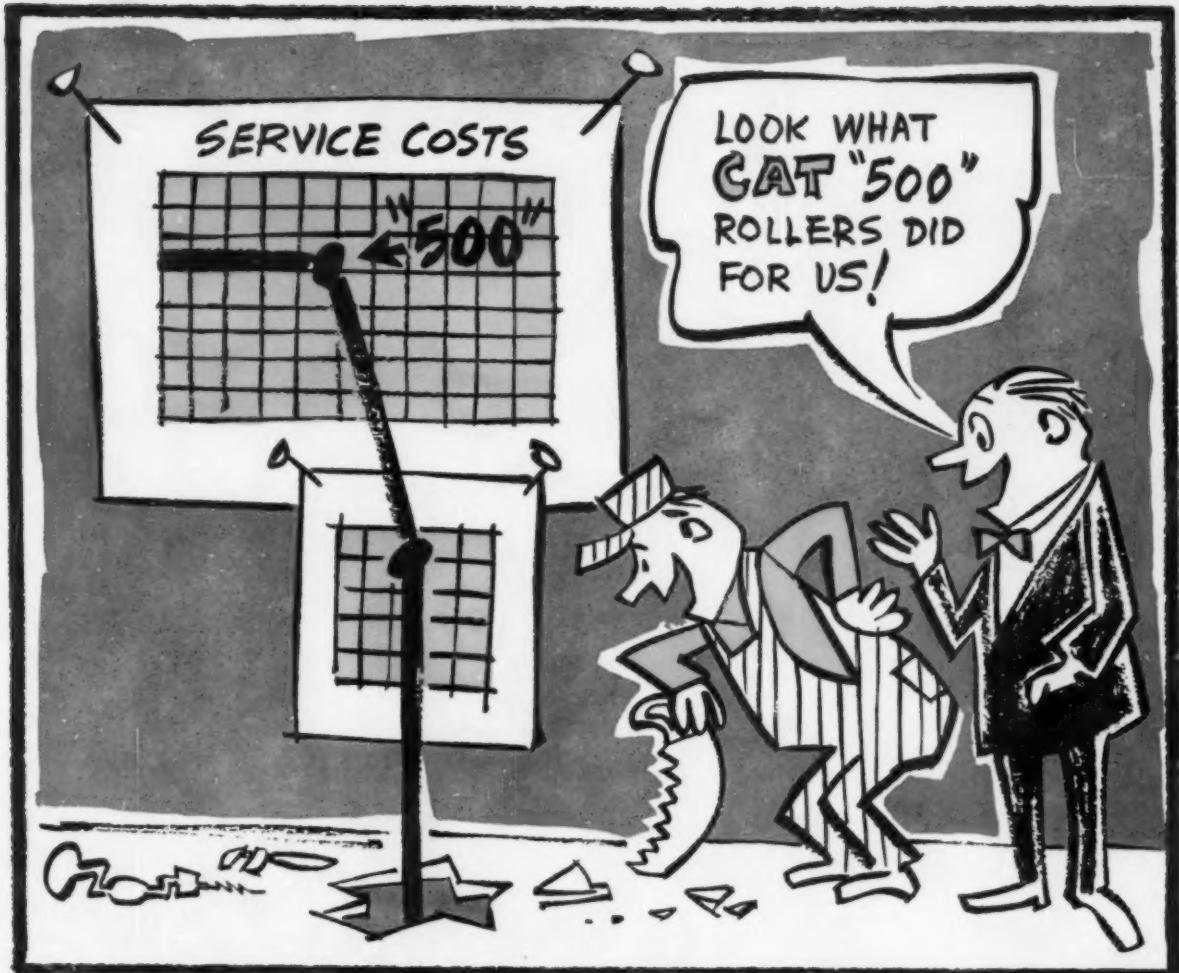
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... for more details circle 318, page 16

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